

Appendix 8

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14 December, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-34686-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Conrail

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

Total Vanadium (V)

pH / Eh ; ORP

Report No.: 460-34686-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Field Sample ID	Lab ID	Matrix	Date Collected	Analysis	
				Hex. Cr	Metals (V)
107_MO32E2_0.0	460-00034686-001	S	12/12/11		X
107_MO32E2_0.5	460-00034686-002	S	12/12/11	X	X
107_MO32E2_1.0	460-00034686-003	S	12/12/11	X	X
107_MO32E2_1.5	460-00034686-004	S	12/12/11	X	X
107_MO32E2_4.0	460-00034686-009	S	12/12/11		X
107_MO32E1_0.0	460-00034686-010	S	12/12/11		X
107_MO32E1_0.5	460-00034686-011	S	12/12/11	X	X
107_MO32E1_1.0	460-00034686-012	S	12/12/11	X	X
107_MO32E1_1.5	460-00034686-013	S	12/12/11	X	X
107_MO30E2_0.0	460-00034686-019	S	12/12/11	X	X
107_MO30E2_0.5	460-00034686-020	S	12/12/11	X	X
107_MO30E2_4.0	460-00034686-027	S	12/12/11		X
REP121211-1	460-00034686-028	S	12/12/11		X
107_MO30E1_0.0	460-00034686-029	S	12/12/11	X	X
107_MO30E1_0.5	460-00034686-030	S	12/12/11	X	X
107_MO30E1_4.0	460-00034686-037	S	12/12/11		X
107_MO28E2_0.0	460-00034686-038	S	12/12/11	X	X
107_MO28E2_0.5	460-00034686-039	S	12/12/11	X	X
107_MO28E2_1.0	460-00034686-040	S	12/12/11	X	X
107_MO28E1_0.0	460-00034686-045	S	12/12/11	X	X
107_MO28E1_0.5	460-00034686-046	S	12/12/11	X	X
107_MO28E1_1.0	460-00034686-047	S	12/12/11	X	X
107_MO28E1_1.5	460-00034686-048	S	12/12/11	X	X
107_MO28E1_2.0	460-00034686-049	S	12/12/11	X	X
107_MO28E1_2.5	460-00034686-050	S	12/12/11	X	X
107_MO28E1_3.0	460-00034686-051	S	12/12/11	X	X
107_MO28W_0.0	460-00034686-052	S	12/12/11	X	X
107_MO28W_0.5	460-00034686-053	S	12/12/11	X	X
107_MO28W_1.0	460-00034686-054	S	12/12/11	X	X
107_MO28W_1.5	460-00034686-055	S	12/12/11	X	X
107_MO28W_2.0	460-00034686-056	S	12/12/11	X	X
107_MO28W_2.5	460-00034686-057	S	12/12/11	X	X
107_MO28W_3.0	460-00034686-058	S	12/12/11	X	X
REP121211-2	460-00034686-059	S	12/12/11	X	
FB121211	460-00034686-060	A	12/12/11	X	X
107_MO26E2_0.5	460-00034686-061	S	12/12/11	X	X
107_MO26E2_1.0	460-00034686-062	S	12/12/11	X	
107_MO26E2_1.5	460-00034686-063	S	12/12/11	X	
107_MO26E2_2.0	460-00034686-064	S	12/12/11	X	
107_MO26E2_2.5	460-00034686-065	S	12/12/11	X	

Field Sample ID	Lab ID	Matrix	Date Collected	Analysis	
				Hex. Cr	Metals (V)
107_MO26E2_3.0	460-00034686-066	S	12/12/11	X	
107_MO26E2_3.5	460-00034686-067	S	12/12/11	X	X
107_MO26E2_4.0	460-00034686-068	S	12/12/11	X	X
107_MO26E2_4.5	460-00034686-069	S	12/12/11	X	X
107_MO26E2_5.0	460-00034686-070	S	12/12/11	X	X
107_MO26E2_6.0	460-00034686-071	S	12/12/11	X	X
REP121211-3	460-00034686-072	S	12/12/11	X	
107_MO26E1_0.5	460-00034686-073	S	12/12/11	X	X
107_MO26E1_1.0	460-00034686-074	S	12/12/11	X	
107_MO26E1_1.5	460-00034686-075	S	12/12/11	X	
107_MO26E1_2.0	460-00034686-076	S	12/12/11	X	
107_MO26E1_2.5	460-00034686-077	S	12/12/11	X	
107_MO26E1_3.0	460-00034686-078	S	12/12/11	X	
107_MO26E1_3.5	460-00034686-079	S	12/12/11	X	
107_MO26E1_4.0	460-00034686-080	S	12/12/11	X	
107_MO26E1_4.5	460-00034686-081	S	12/12/11	X	
107_MO26E1_5.0	460-00034686-082	S	12/12/11	X	
107_MO26E1_6.0	460-00034686-083	S	12/12/11	X	
REP121211-4	460-00034686-084	S	12/12/11	X	
107_MO26W1_0.5	460-00034686-085	S	12/12/11	X	X
107_MO26W1_1.0	460-00034686-086	S	12/12/11	X	
107_MO26W1_1.5	460-00034686-087	S	12/12/11	X	
107_MO26W1_2.0	460-00034686-088	S	12/12/11	X	
107_MO26W1_2.5	460-00034686-089	S	12/12/11	X	
107_MO26W1_3.0	460-00034686-090	S	12/12/11	X	X
REP121211-5	460-00034686-096	S	12/12/11	X	

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 60 (Cr⁺⁶) ; 43 (V)
Bold Type indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperatures of -3.1 and 1.9 °C. No sample condition issues were noted in the sample receipt log ; no QA action was necessary.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤24 hours for aqueous matrix; ≤30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination.

Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The matrix spike recovery for soluble Cr⁺⁶ in batch QC sample MO28W-3.0 (460-34686-58) was below the lower limit, with the sample native (unspiked) concentration >4x spike-added concentration (272 mg/Kg vs. 43 mg/Kg spiked). The sample was not re-spiked and re-analyzed; per NJDEP DV guidance, no further action is necessary and associated results are acceptable for use, therefore no QA action was taken.

SECTION D Total Metals (V)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference. No positive element results were reported for the field blank sample.

SECTION E ReDox Characteristics

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found.

SECTION F COLLOCATED SAMPLES

Precision of collocated samples is being reported separately.

SECTION G Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,

Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

17 December, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-34781-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

Total Vanadium (V)

pH / Eh ; ORP

Report No.: 460-34781-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Field Sample ID	Lab ID	Matrix	Date Collected	Hex. Cr	Metals (V)
107_MO20N_0.0	460-00034781-001	S	12/13/11		X
107_MO20N_1.0	460-00034781-002	S	12/13/11	X	X
107_MO20N_1.5	460-00034781-003	S	12/13/11	X	X
107_MO20N_2.5	460-00034781-004	S	12/13/11	X	X
107_MO20N_3.0	460-00034781-005	S	12/13/11	X	X
107_MO20N_3.5	460-00034781-006	S	12/13/11	X	
107_MO20N_4.0	460-00034781-007	S	12/13/11	X	
REP121311-1	460-00034781-008	S	12/13/11	X	X
107_MO22N_0.0	460-00034781-009	S	12/13/11		X
107_MO22N_1.0	460-00034781-010	S	12/13/11		X
107_MO24N_0.5	460-00034781-014	S	12/13/11		X
107_MO26N_0.5	460-00034781-018	S	12/13/11	X	X
107_MO26N_1.0	460-00034781-019	S	12/13/11	X	
107_MO26N_1.5	460-00034781-020	S	12/13/11	X	
107_MO26N_2.0	460-00034781-021	S	12/13/11	X	
107_MO26N_2.5	460-00034781-022	S	12/13/11	X	
107_MO26N_3.0	460-00034781-023	S	12/13/11	X	
107_MO28N_0.0	460-00034781-029	S	12/13/11	X	X
107_MO28N_0.5	460-00034781-030	S	12/13/11	X	X
107_MO28N_1.0	460-00034781-031	S	12/13/11	X	X
107_MO28N_3.0	460-00034781-035	S	12/13/11		X
REP121311-2	460-00034781-036	S	12/13/11	X	X
107_MO30N_0.0	460-00034781-037	S	12/13/11	X	X
107_MO30N_0.5	460-00034781-038	S	12/13/11	X	X
107_MO32N_0.0	460-00034781-046	S	12/13/11		X
107_MO32N_0.5	460-00034781-047	S	12/13/11	X	X
107_MO32N_1.0	460-00034781-048	S	12/13/11	X	X
107_MO32N_1.5	460-00034781-049	S	12/13/11	X	X
107_MO34N_3.0	460-00034781-055	S	12/13/11		X
107_MO34N_3.5	460-00034781-056	S	12/13/11		X
REP121311-3	460-00034781-060	S	12/13/11		X
107_MO26W2_0.5	460-00034781-061	S	12/13/11	X	X
107_MO26W2_1.0	460-00034781-062	S	12/13/11	X	
107_MO26W2_1.5	460-00034781-063	S	12/13/11	X	
107_MO26W2_2.0	460-00034781-064	S	12/13/11	X	
107_MO26W2_2.5	460-00034781-065	S	12/13/11	X	
107_MO26W2_3.0	460-00034781-066	S	12/13/11	X	
107_MO20E2_0.0	460-00034781-073	S	12/13/11		X
107_MO20E2_1.0	460-00034781-074	S	12/13/11	X	X
107_MO20E2_1.5	460-00034781-075	S	12/13/11	X	X

Field Sample ID	Lab ID	Matrix	Date Collected	Hex. Cr	Metals (V)
107_MO20E2_2.5	460-00034781-076	S	12/13/11	X	X
107_MO20E2_3.0	460-00034781-077	S	12/13/11	X	X
107_MO20E2_3.5	460-00034781-078	S	12/13/11	X	X
107_MO20E2_4.0	460-00034781-079	S	12/13/11	X	X
FB121311-1	460-00034781-080	A	12/13/11	X	X

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 35 (Cr⁺⁶) ; 33 (V)
Bold Type indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperatures of -5.5 and 4.6 °C. No sample condition issues were noted in the sample receipt log ; no QA action was necessary.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤24 hours for aqueous matrix; ≤30 days for non-aqueous matrix) were met for all samples, with the following exceptions:

Samples 107_MO20N_4.0, 107_MO20N_3.5, 107_MO20E2_3.5 and 107_MO20E2_4.0 (Lab IDs 460-34781-7, 6, 78 and 79, respectively) were initially digested and analyzed within the 30-day hold time. Due to soluble MS recovery above the upper limit (142% vs. 125%), the batch required re-digestion and re-analysis, which was performed 12 days outside holding time. *Although the re-digestion analysis soluble MS recovery was within limits, these results are not usable, since the extended hold time (i.e., >32 days from collection) is a rejectable deficiency. Therefore, it is recommended that the data user accept the initial results for the noted QC batch sample group, qualified as estimated 'J', with indication of potential high bias based on the initial prep and analysis high MS recovery.*

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination.

Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The matrix spike recovery for soluble Cr⁺⁶ in batch QC sample 107_MO20N_4.0 (Lab ID: 460-34781-7) was above the upper limit (at 142%). Although the sample and associated QC batch samples were re-digested, re-spike and re-analyzed, this was performed 42 days from collection; per NJDEP DV guidance all samples which are digested / analyzed beyond 32 days from collection are rejected. Therefore, the initial batch results are qualified estimated 'J', with indication of potential high bias.

The matrix duplicate precision result for Cr⁺⁶ in batch QC sample 107_MO20N_4.0 (Lab ID: 460-34781-7) exceeded the applicable limit of 20% RPD, at 53%. Refer to comments regarding holding time exceedance above; all associated batch samples are qualified as estimated 'J', due to duplicate precision limit exceedance.

No ORP values were reported for samples 107_MO20N_3.5 and 107_MO20N_4.0. It is noted that all other non-aqueous samples reported in this SDG indicated oxidizing tendency based on measured ORP values.

SECTION D
Total Metals (V)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

No positive element results were reported for the field blank sample (FB121311).

SECTION E
ReDox Characteristics

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found.

SECTION F
COLLOCATED SAMPLES

Precision of collocated samples is being reported separately.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

18 December, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-34820-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

Total Vanadium (V)

pH / Eh ; ORP

Report No.: 460-34820-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Field Sample ID	Lab ID	Matrix	Date Collected	Hex. Cr	Metals (V)
107_MO20E1_0.0	460-00034820-001	S	12/14/11		X
107_MO20E1_1.0	460-00034820-002	S	12/14/11	X	X
107_MO20E1_1.5	460-00034820-003	S	12/14/11	X	X
107_MO20E1_2.5	460-00034820-004	S	12/14/11	X	X
107_MO20E1_3.0	460-00034820-005	S	12/14/11	X	X
107_MO20E1_3.5	460-00034820-006	S	12/14/11	X	X
107_MO20E1_4.0	460-00034820-007	S	12/14/11	X	X
107_MO20W_0.0	460-00034820-008	S	12/14/11		X
107_MO20W_1.0	460-00034820-009	S	12/14/11	X	X
107_MO20W_1.5	460-00034820-010	S	12/14/11	X	X
107_MO20W_2.5	460-00034820-011	S	12/14/11	X	X
107_MO20W_3.0	460-00034820-012	S	12/14/11	X	X
107_MO20W_3.5	460-00034820-013	S	12/14/11	X	X
107_MO20W_4.0	460-00034820-014	S	12/14/11	X	X
108_MO18E2_1.0	460-00034820-015	S	12/14/11	X	X
108_MO18E2_3.0	460-00034820-016	S	12/14/11	X	X
108_MO18E2_3.5	460-00034820-017	S	12/14/11	X	X
108_MO18E2_4.0	460-00034820-018	S	12/14/11	X	X
108_MO18E2_4.5	460-00034820-019	S	12/14/11	X	X
108_MO18E2_5.0	460-00034820-020	S	12/14/11	X	X
REP121411-1	460-00034820-021	S	12/14/11	X	X
108_MO18E1_0.5	460-00034820-022	S	12/14/11	X	X
108_MO18E1_1.0	460-00034820-023	S	12/14/11	X	X
108_MO18E1_3.0	460-00034820-024	S	12/14/11	X	X
108_MO18E1_3.5	460-00034820-025	S	12/14/11	X	X
108_MO18E1_4.0	460-00034820-026	S	12/14/11		X
108_MO18E1_4.5	460-00034820-027	S	12/14/11		X
108_MO18E1_5.0	460-00034820-028	S	12/14/11		X
REP121411-2	460-00034820-029	S	12/14/11	X	X
108_MO18N_1.0	460-00034820-030	S	12/14/11	X	X
108_MO18N_1.5	460-00034820-031	S	12/14/11	X	X
108_MO18N_2.0	460-00034820-032	S	12/14/11	X	X
108_MO18N_3.0	460-00034820-033	S	12/14/11	X	X
108_MO18N_3.5	460-00034820-034	S	12/14/11	X	X
108_MO18W1_0.5	460-00034820-038	S	12/14/11	X	X
108_MO18W1_1.0	460-00034820-039	S	12/14/11	X	X
108_MO18W1_1.5	460-00034820-040	S	12/14/11	X	X
108_MO18W1_2.5	460-00034820-041	S	12/14/11	X	X
108_MO18W1_3.0	460-00034820-042	S	12/14/11	X	X
108_MO18W1_3.5	460-00034820-043	S	12/14/11	X	X
108_MO18W1_2.0	460-00034820-047	S	12/14/11	X	X
REP121411-3	460-00034820-048	S	12/14/11	X	X
108_MO18W2_0.5	460-00034820-049	S	12/14/11	X	X
108_MO18W2_1.0	460-00034820-050	S	12/14/11	X	X
108_MO18W2_3.0	460-00034820-051	S	12/14/11	X	X
108_MO18W2_4.0	460-00034820-052	S	12/14/11	X	X
108_MO18W2_4.5	460-00034820-053	S	12/14/11		X
108_MO18W2_5.0	460-00034820-054	S	12/14/11		X
FB121411-1	460-00034820-055	A	12/14/11	X	X
QC Sample	460-00034820-056	S	12/14/11	X	

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 43 (Cr⁺⁶) ; 49 (V)**Bold Type** indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperatures of -2.7 and 3.4 °C. No sample condition issues were noted in the sample receipt log ; no QA action was necessary.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination.

Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr^{+6} concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The matrix spike recoveries for soluble and insoluble Cr^{+6} in SDG batch QC sample 108_M018N_3.0 (Lab ID: 460-34820-33) were below the lower limit, and below 50% on initial and re-analysis, affecting associated samples (34820-032, 033, 034. Positive Cr^{+6} results for these samples were flagged as estimated 'J', with indication of significant low bias, since the samples were characterized as oxidizing in nature, which should support the presence of hexavalent chromium.

The matrix spike recoveries for soluble Cr^{+6} in SDG batch QC sample REP121411-3 (Lab ID: 460-34820-48) were below the lower limit, but above 50% on initial and re-analysis, affecting associated samples (34820-009, 010, 023, 024, 025, 029030, 031, 038, 039, 040, 041, 042, 043, 048, 049, 050, 051 and 052. Positive Cr^{+6} results for these samples were flagged as estimated 'J', and non-detect results flagged 'UJ', with indication of low bias, since the samples were characterized as oxidizing in nature, which should support the presence of hexavalent chromium.

SECTION D Total Metals (V)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found. It is noted that the native sample concentrations for vanadium in QC batch samples 34820-2 and 34820-51 exceeded the spike-added concentration by $\gg 4x$, thus obviating meaningful recovery information from these samples. No QA action was necessary.

No positive element results were reported for the field blank sample.

SECTION E
ReDox Characteristics

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found.

SECTION F
COLLOCATED SAMPLES

Precision of collocated samples is being reported separately.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

03 January, 2013

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: CONRAIL - PPG Site , Laboratory Case No. E12-11760

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: CONRAIL - PPG Site

Fractions

Hexavalent chromium (Cr⁺⁶)
pH / Eh ; ORP

Laboratory: Integrated Analytical Laboratories, LLC

Report No.: E12-11760

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), NJ Laboratory ID Cert. No. 14751. Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID	Lab ID	Matrix	Date Collected	Hex. Cr
108_M018W 2_2-2.0-2.5	11760-001	S	11/29/12	X
108_M018W 2_2-3.0-3.5	11760-002	S	11/29/12	X
<i>108_M018W 2_2-4.0-4.5</i>	<i>11760-003</i>	S	11/29/12	X
108_M018W 2_2-5.0-5.5	11760-004	S	11/29/12	X
108_M018W 2_3-2.0-2.5	11760-005	S	11/29/12	X
<i>108_M018N 2-1.5-2.0</i>	<i>11760-009</i>	S	11/29/12	X
108_M018N 2-2.0-2.5	11760-010	S	11/29/12	X
108_M018N 2-3.0-3.5	11760-011	S	11/29/12	X
108_M018N 2-4.0-4.5	11760-012	S	11/29/12	X
107_M018E2_N 1-1.0-1.5	11760-014	S	11/29/12	X
107_M029E2_N 1-1.0-1.5	11760-019	S	11/29/12	X
107_M020E2_N 1.5-2.0	11760-020	S	11/29/12	X
107_M020E2_N 2.5-3.0	11760-021	S	11/29/12	X
107_M020E2_N 3.0-3.5	11760-022	S	11/29/12	X
107_M026E2_N 0.5-1.0	11760-025	S	11/29/12	X
107_M026E2_N 1.5-2.0	11760-026	S	11/29/12	X
107_M026E2_N 2.5-3.0	11760-027	S	11/29/12	X
107_M026E2_N 3.5-4.0	11760-028	S	11/29/12	X
107_M026E2_N 4.5-5.0	11760-029	S	11/29/12	X
107_M026E2_N 5.5-6.0	11760-030	S	11/29/12	X
107_M026W2_N 1.5-2.0	11760-032	S	11/29/12	X
107_M026W2_N 2.0-2.5	11760-033	S	11/29/12	X
107_M026W2_N 2.5-3.0	11760-034	S	11/29/12	X
<i>REP-112912-1</i>	<i>11760-036</i>	S	11/29/12	X
<i>REP-112912-2</i>	<i>11760-037</i>	S	11/29/12	X
FB-112912	11760-038	A	11/29/12	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 26

Bold Type indicates sample taken as a Batch QC sample*Italic type* indicates samples are collocated field duplicates

All samples were received one day from collection. Samples were received on ice at recorded temperature of -4°C. No sample condition issues were noted in the sample receipt log ; no QA action was necessary.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, laboratory duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. When samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range, reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

No data validation qualifiers were necessary for the reported hexavalent chromium results.

SECTION D
Total Metals

No samples in this SDG were requested for total metals analysis.

SECTION E
pH / Eh (ORP) / Ferrous Iron / Sulfide

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP112912-1 was identified as being collocated with 108_M018N_2_1.5-2.0, and REP112912-2 was identified as being collocated with 108_M018W2_2_4.0-4.5. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x RL

	REP112912-1	M018N_2_1.5-2.0	%RPD *
Cr (VI)	0.489	3.48	2.99 *
	REP112912-2	M018W2_2_4.0-4.5	
Cr (VI)	0.998	5.82	4.82 *

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x RL values, and difference >2x RL if either sample is <5x CRQL. It is noted that the precision values (based on absolute concentration difference) for the identified collocated sample pairs exceed this criterion, signifying sample matrix non-homogeneity and potential impact on sample representativeness. No data qualifiers were applied by the reviewer; however the data user should incorporate this information in assessing overall data usability.

Dresdner-Robin

Mr. Douglas Neumann

03 January, 2013

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

19 April, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 and 108, Laboratory Job No. 460-22438-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22438-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_-	Lab ID 460-22438-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
G032_0.0	1	S	01/24/11	X	X
G032_3.5	2	S	01/24/11	X	X
G032_7.5	3	S	01/24/11	X	X
G034_0.0	4	S	01/24/11	X	X
G034_3.5	5	S	01/24/11	X	X
G034_7.5	6	S	01/24/11	X	X
G034_11.0	7	S	01/24/11	X	X
G034_15.0	8	S	01/24/11	X	X
G034_19.0	9	S	01/24/11	X	X
I032_0.0	10	S	01/24/11	X	X
I032_3.5	11	S	01/24/11	X	X
I032_7.5	12	S	01/24/11	X	X
I032_10.0	13	S	01/24/11	X	X
I032_14.5	14	S	01/24/11	X	X
I032_18.5	15	S	01/24/11	X	X
I034_0.0	16	S	01/24/11	X	X
I034_3.5	17	S	01/24/11	X	X
I034_7.5	18	S	01/24/11	X	X
I034_11.5	19	S	01/24/11	X	X
I034_15.5	20	S	01/24/11	X	X
FB-1	21FB	A	01/24/11	X	X
I034_19.5	22	S	01/24/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 22

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day after collection. Samples were received on ice at recorded temperature of 2.4°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was not detected in Field Blank FB-1.

No collocated field duplicate samples were identified for this sample delivery group.

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recovery for antimony (Sb) in the matrix spike of sample 107_G032_3.5 (Lab ID# 460-22438-2) was below the lower limit of 75%, at 67%. Results for Sb in associated field samples were flagged as estimated values 'UJ' or 'J', with indication of low bias due to matrix effects. The associated LCS recoveries for Sb were within acceptable limits, indicating analytical process control.

It is noted that no post-digestion spike sample was reported for this delivery group. A serial dilution sample was reported, with acceptable precision shown; however, for Sb, none of the reported results were above the minimum threshold values for meaningful precision interpretation. Therefore, the indication of low bias for reported Sb results based on matrix spike recovery is maintained.

No positive element results were reported for the field blank sample (FB-1).

No collocated field duplicate samples were identified for this sample delivery group.

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

Dresdner-Robin

Mr. Douglas Neumann

19 April, 2011

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

25 April, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 and 108, Laboratory Job No. 460-22465-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22465-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_-	Lab ID 460-22465-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
K032_0.0	1	S	01/25/11	X	X
K032_3.5	2	S	01/25/11	X	X
K032_7.5	3	S	01/25/11	X	X
K032_10.5	4	S	01/25/11	X	X
K032_14.5	5	S	01/25/11	X	X
K032_18.5	6	S	01/25/11	X	X
K036_0.0	7	S	01/25/11	X	X
K036_3.5	8	S	01/25/11	X	X
K036_7.5	9	S	01/25/11	X	X
I036_0.0	10	S	01/25/11	X	X
I036_3.5	11	S	01/25/11	X	X
I036_7.5	12	S	01/25/11	X	X
I036_11.5	13	S	01/25/11	X	X
I036_15.5	14	S	01/25/11	X	X
I036_19.5	15	S	01/25/11	X	X
I036_23.5	16	S	01/25/11	X	X
G036_0.0	17	S	01/25/11	X	X
G036_5.0	18	S	01/25/11	X	X
G036_6.0	19	S	01/25/11	X	X
G036_7.0	20	S	01/25/11	X	X
G036_15.0	21	S	01/25/11	X	X
G036_19.0	22	S	01/25/11	X	X
G036_23.0	23	S	01/25/11	X	X
E034_0.0	24	S	01/25/11	X	X
E034_3.5	25	S	01/25/11	X	X
E034_7.5	26	S	01/25/11	X	X
E034_10.5	27	S	01/25/11	X	X
E034_14.5	28	S	01/25/11	X	X
E034_18.5	29	S	01/25/11	X	X
G038_0.0	30	S	01/25/11	X	X
G038_4.5	31	S	01/25/11	X	X
G038_6.0	32	S	01/25/11	X	X
G038_7.0	33	S	01/25/11	X	X
Rep012511-1	34	S	01/25/11	X	X
Rep012511-2	35	S	01/25/11	X	X
FB-1	36	A	01/25/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 36

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day after collection. Samples were received on ice at recorded temperatures of 0.2 and 5.3°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr^{+6} was not detected in Field Blank FB-1.

Matrix spike recoveries for soluble Cr^{+6} in samples 460-22465-18 and -32 (107_G036_5.0 and 107_G038_6.0, respectively) were below the allowable limit of 75% in both initial and re-analyses, with recoveries in sample 460-22465-18 below 50% (49%, 17%).

- QA Action: 1) Qualify Cr^{+6} results in batch samples associated with 460-22465-18 (samples 1 – 20) as rejected, 'R', per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e). See Data Usability comments below.

2) Qualify Cr^{+6} results in batch samples associated with 460-22465-32 (samples 21 – 35) as estimated, 'UJ' or 'J', with the potential for low bias. See Data Usability comments below.
- Data Usability: 1) Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr^{+6} . The following associated batch samples were characterized as "Reducing" based upon the Method 3060A, Table 2 phase diagram: 460-22465- 4, -5, -8, -14, -15, -17, -18; these samples are not likely to support the presence of Cr^{+6} , or if positive, may be low-biased.

2) Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr^{+6} . The following associated batch samples were characterized as "Reducing" based upon the Method 3060A, Table 2 phase diagram: 460-22465- 21, -22, -24, -28, -29, -30; these samples are not likely to support the presence of Cr^{+6} .

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The duplicate precision values for chromium (Cr) and nickel (Ni) in the matrix duplicate of sample 107_G038_6.0 (Lab ID# 460-22465-32) were above the upper limit of 20% RPD, at 22% and 21%, respectively. The duplicate precision value for nickel in the matrix duplicate of sample REP012511-2 (Lab ID# 460-22465-35) was above the upper limit of 20% RPD, at 49%.

- QA Action: 1) Qualify Cr and Ni results in associated samples 460-22465-29 through -34 (inclusive) as estimated, 'UJ' or 'J', with indeterminate bias direction.

 2) Qualify Ni in sample REP012511-2 and its collocated sample 107_E034-3.5 as estimated, 'J', with indeterminate bias direction.

No positive element results were reported for the field blank sample (FB-1).

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; refer to the data usability section above.

SECTION F COLLOCATED SAMPLES

107_REP012511-1 and 107_REP012511-2 were identified as being collocated with I036_3.5 and E034_3.5, respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	I036_3.5	R012511-1	%RPD	E034_3.5	R012511-2	%RPD*
Chromium	81.6	64.9	22.8	39.6	100	86.5
Nickel	18.2	24.5	29.5	43.1	51.1	17.0
Antimony	ND	ND	nc	ND	1.9	1.9 *
Thallium	ND	ND	nc	ND	ND	nc
Vanadium	28.6	28.9	1.0	22.0	21.9	0.5
Cr (VI)	ND	ND	nc	2.6	3.1	0.5 *

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL.

- QA Action: Qualify total chromium results in E034_3.5 and 107_REP012511-2 as estimated, 'J', due to collocated sample precision in exceedance of guidance threshold. Bias direction is indeterminate.

SECTION G Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

02 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-22506-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22506-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID	Lab ID	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
107_-	460-22506-				
I038_0.0	1	S	01/26/11	X	X
I038_3.5	2	S	01/26/11	X	X
I038_6.5	3	S	01/26/11	X	X
I038_7.0	4	S	01/26/11	X	X
I038_8.0	5	S	01/26/11	X	X
I038_10.0	6	S	01/26/11	X	X
I038_11.0	7	S	01/26/11	X	X
I038_12.0	8	S	01/26/11	X	X
I038_17.0	9	S	01/26/11	X	X
I038_21.0	10	S	01/26/11	X	X
I038_25.0	11	S	01/26/11	X	X
K038_0.0	12	S	01/26/11	X	X
K038_3.5	13	S	01/26/11	X	X
K038_7.5	14	S	01/26/11	X	X
K038_11.5	15	S	01/26/11	X	X
K038_15.5	16	S	01/26/11	X	X
K038_16.5	17	S	01/26/11	X	X
K038_20.5	18	S	01/26/11	X	X
K038_24.5	19	S	01/26/11	X	X
K040_0.0	20	S	01/26/11	X	X
K040_3.5	21	S	01/26/11	X	X
K040_7.5	22	S	01/26/11	X	X
K040_11.5	23	S	01/26/11	X	X
K040_16.0	24	S	01/26/11	X	X
K040_20.0	25	S	01/26/11	X	X
K040_24.0	26	S	01/26/11	X	X
I040_0.0	27	S	01/26/11	X	X
I040_3.5	28	S	01/26/11	X	X
I040_7.5	29	S	01/26/11	X	X
I040_11.5	30	S	01/26/11	X	X
I040_15.5	31	S	01/26/11	X	X
I040_16.5	32	S	01/26/11	X	X
I040_20.5	33	S	01/26/11	X	X
I040_24.5	34	S	01/26/11	X	X
FB012611	35 FB	A	01/26/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 35

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day after collection. Samples were received on ice at recorded temperature of 2.3°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr^{+6} was detected in Field Blank FB-1, at 1.8 J ug/L; this is equivalent to a nominal value of 0.072 mg/Kg. For qualification assessment, associated positive Cr^{+6} soil results below 3x adjusted nominal value are negated, while results $>3x$ but $<10x$ adjusted nominal values are qualified as estimated, 'J', with indication of positive bias.

- QA Action: The reported Cr^{+6} result for sample 460-22506-9 (107_I038_17.0) was $>3x$ but $<10x$ the adjusted nominal Field Blank value, and was flagged as estimated, 'J', with indication of positive bias due to field blank contamination.

No collocated field duplicate samples were identified for this sample delivery group.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The duplicate precision values for chromium (Cr) and nickel (Ni) in the matrix duplicate of sample 460-22465-32 were above the upper limit of 20% RPD, at 22% and 21%, respectively. It is noted that although this batch duplicate sample was not from this SDG's samples, it is from this site, and thus may be considered to be of similar matrix type.

- QA Action: Qualify Cr and Ni results in associated samples 460-22506-21 through -34 (inclusive) as estimated, 'UJ' or 'J', with indeterminate bias direction.

It is noted that no post-digestion spike sample was reported for this delivery group. Serial dilution samples were reported, with acceptable precision.

No positive element results were reported for the field blank sample (FB012611).

No collocated field duplicate samples were identified for this sample delivery group.

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

03 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-22560-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22560-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_-	Lab ID 460-22560-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
G040_0.0-0.5	1	S	01/28/11	X	X
G040_3.5	2	S	01/28/11	X	X
G040_4.5	3	S	01/28/11	X	X
G040_5.0	4	S	01/28/11	X	X
G040_7.5	5	S	01/28/11	X	X
G040_11.5	6	S	01/28/11	X	X
G040_14.5	7	S	01/28/11	X	X
G042_0.0-0.5	8	S	01/28/11	X	X
G042_3.5	9	S	01/28/11	X	X
G042_7.5	10	S	01/28/11	X	X
G042_11.5	11	S	01/28/11	X	X
G042_14.0	12	S	01/28/11	X	X
G042_18.0	13	S	01/28/11	X	X
G042_22.0	14	S	01/28/11	X	X
I042_0.0-0.5	15	S	01/28/11	X	X
I042_3.5	16	S	01/28/11	X	X
I042_7.5	17	S	01/28/11	X	X
I042_11.5	18	S	01/28/11	X	X
I042_14.5	19	S	01/28/11	X	X
I042_18.5	20	S	01/28/11	X	X
I042_22.5	21	S	01/28/11	X	X
K042_0.0	22	S	01/28/11	X	X
K042_3.5	23	S	01/28/11	X	X
K042_7.5	24	S	01/28/11	X	X
K042_11.5	25	S	01/28/11	X	X
K042_15.0	26	S	01/28/11	X	X
K042_19.0	27	S	01/28/11	X	X
K042_23.0	28	S	01/28/11	X	X
G044_0.0-0.5	29	S	01/28/11	X	X
G044_3.5	30	S	01/28/11	X	X
G044_7.5	31	S	01/28/11	X	X
G044_15.0	32	S	01/28/11	X	X
G044_19.0	33	S	01/28/11	X	X
G044_23.0	34	S	01/28/11	X	X
FB012811	35	A	01/28/11	X	X
REP012811	36	S	01/28/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 36

Bold Type indicates sample taken as a Batch QC sample

All samples were received on the same day as collected. Samples were received on ice at recorded temperature of 3.1°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr^{+6} was not detected in Field Blank FB-1.

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

No positive element results were reported for the field blank sample (FB-1).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges; refer to the data usability section above.

SECTION F
COLLOCATED SAMPLES

Sample 107_REP012811-1 was identified as being collocated with sample 107_I042_3.5. Precision results are tabulated below.

Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	I042_3.5	R012811-1	%RPD *
Chromium	26.7	24.5	8.6
Nickel	15.5	21.3	5.8 *
Antimony	1.1	ND	1.1 *
Thallium	ND	ND	nc
Vanadium	22.1	25.7	3.6 *
Cr (VI)	ND	5.9	5.9 *

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL.

- QA Action: Qualify Cr⁺⁶ results in I042_3.5 and 107_REP012811-1 as estimated, 'J', due to collocated sample precision in exceedance of guidance threshold. Bias direction is indeterminate.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

05 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-22638-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Total Metals (Cr, Ni, Sb, Tl, V)

pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22638-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID	Lab ID	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
107_-	460-22638-				
F040_0.0	1	S	01/31/11	X	X
F040_3.5	2	S	01/31/11	X	X
F040_5.5	3	S	01/31/11	X	X
F040_6.0	4	S	01/31/11	X	X
F040_6.5	5	S	01/31/11	X	X
F040_7.5	6	S	01/31/11	X	X
F040_11.5	7	S	01/31/11	X	X
F040_15.0	8	S	01/31/11	X	X
F040_19.0	9	S	01/31/11	X	X
F040_22.5	10	S	01/31/11	X	X
I044_0.0	11	S	01/31/11	X	X
I044_3.5	12	S	01/31/11	X	X
I044_7.5	13	S	01/31/11	X	X
I044_11.5	14	S	01/31/11	X	X
I044_13.5	15	S	01/31/11	X	X
I044_17.5	16	S	01/31/11	X	X
I044_21.5	17	S	01/31/11	X	X
K044_0.0	18	S	01/31/11	X	X
K044_3.5	19	S	01/31/11	X	X
K044_7.5	20	S	01/31/11	X	X
K044_11.5	21	S	01/31/11	X	X
K044_14.5	22	S	01/31/11	X	X
K044_18.5	23	S	01/31/11	X	X
K044_22.5	24	S	01/31/11	X	X
K046_0.0	25	S	01/31/11	X	X
K046_3.5	26	S	01/31/11	X	X
K046_11.5	27	S	01/31/11	X	X
K046_15.5	28	S	01/31/11	X	X
K046_19.5	29	S	01/31/11	X	X
REP013111	30	S	01/31/11	X	X
FB013111	31FB	A	01/31/11	X	X
G046_0.0	32	S	01/31/11	X	X
G046_3.5	33	S	01/31/11	X	X
G046_4.5	34	S	01/31/11	X	X
G046_5.0	35	S	01/31/11	X	X
G046_5.5	36	S	01/31/11	X	X

Sample ID 107_-	Lab ID 460-22638-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
G046_7.5	37	S	01/31/11	X	X
G046_10.0	38	S	01/31/11	X	X
G046_14.0	39	S	01/31/11	X	X
G046_18.0	40	S	01/31/11	X	X
I046_0.0	41	S	01/31/11	X	X
I046_3.5	42	S	01/31/11	X	X
I046_7.5	43	S	01/31/11	X	X
I046_11.5	44	S	01/31/11	X	X
I046_15.5	45	S	01/31/11	X	X
I046_19.5	46	S	01/31/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 46

Bold Type indicates sample taken as a Batch QC sample

All samples were received on the same day as collected. Samples were received on ice at recorded temperature of 2.4°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was not detected in Field Blank FB-1.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recovery for antimony (Sb) in the matrix spike of sample 107_K044_7.5 (Lab ID# 460-22638-20) was below the lower limit of 75%, at 49%. The associated LCS recoveries for Sb were within acceptable limits, indicating analytical process control.

- QA Action: Qualify Sb results in associated field samples (460-22638-17-30, 32-35 and 6-7) as estimated values 'UJ' or 'J', with indication of low bias due to matrix effects.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported, with acceptable precision shown; however, for Sb, none of the reported results were above the minimum threshold values for meaningful precision interpretation. Therefore, the indication of low bias for associated Sb results based on matrix spike recovery is maintained.

No positive element results were reported for the field blank sample (FB-1).

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges; refer to the data usability section above.

SECTION F COLLOCATED SAMPLES

Sample 107_REP013111-1 was identified as being collocated with sample 107_K046_3.5. Precision results are tabulated below.

Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	K046_3.5	R013111-1	%RPD *
Chromium	32.3	31.4	2.8
Nickel	35.9	66.6	30.7 *
Antimony	ND	3.9	3.9 *
Thallium	ND	ND	nc
Vanadium	147	165	11.5
Cr (VI)	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL.

- QA Action: Qualify Ni results in K046_3.5 and 107_REP013111-1 as estimated, 'J', due to collocated sample precision in exceedance of guidance threshold. Bias direction is indeterminate.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

18 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 & 108, Laboratory Job No. 460-22912-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 & 108

Fractions

Hexavalent chromium (Cr⁺⁶)

Total Metals (Cr, Ni, Sb, Tl, V)

pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22912-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 108_-	Lab ID 460-22912-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
D008_0.0	1	S	02/08/11	X	X
D008_4.0	2	S	02/08/11	X	X
D008_7.5	3	S	02/08/11	X	X
D008_11.5	4	S	02/08/11	X	X
D008_15.5	5	S	02/08/11	X	X
D008_18.0	6	S	02/08/11	X	X
J008_0.0	7	S	02/08/11	X	X
J008_3.5	8	S	02/08/11	X	X
J008_7.5	9	S	02/08/11	X	X
J008_11.5	10	S	02/08/11	X	X
J008_15.5	11	S	02/08/11	X	X
J008_15.5	11MSS	S	02/08/11	X	X
Sample ID 107_-	Lab ID 460-22912-	Matrix	Date Collected		
K034_0.0	12	S	02/08/11	X	X
K034_3.5	13	S	02/08/11	X	X
K034_7.5	14	S	02/08/11	X	X
K034_11.5	15	S	02/08/11	X	X
K034_15.5	16	S	02/08/11	X	X
K034_19.5	17	S	02/08/11	X	X
M046_0.0	18	S	02/08/11	X	X
M046_3.5	19	S	02/08/11	X	X
M046_8.0	20	S	02/08/11	X	X
M046_12.0	21	S	02/08/11	X	X
M046_16.0	22	S	02/08/11	X	X
FB020811	23FB	A	02/08/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 24

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day following collection. Samples were received on ice at recorded temperature of 2.1 °C, in good condition.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was not detected in Field Blank FB-1.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, LCS recoveries and serial dilution sample precision, *with the exceptions detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recoveries for chromium (Cr) and vanadium (V) in the matrix spike of sample 460-22948-9 were reported below the lower limit of 75%, at 66% and 66%, respectively. The associated LCS recoveries for Cr and V were within acceptable limits, indicating analytical process control. *It is noted that this batch spike sample was not from this SDG's samples, but was from this site, and thus may be considered as representative of this SDG's sample matrix characteristics.*

- QA Action: Qualify Cr and V results in associated field samples (460-22912-14 through -22) as estimated values 'UJ' or 'J', with indication of low bias due to matrix effects.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported ; however, for Cr and V, none of the reported results were above the minimum threshold values for meaningful precision interpretation. Therefore, the indication of low bias for associated Cr and V results based on matrix spike recovery is maintained.

No positive element results were reported for the field blank sample (FB-1).

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

No collocated samples were identified for this SDG.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

06 June, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 & 108, Laboratory Job No. 460-22930-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 & 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22930-1

Matrix: Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 method 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3010A and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Site ID	Sample ID	Lab ID 460-22930-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
108_	TMW-J008	1	A	02/09/11	X	X
107_	TMW-K034	2	A	02/09/11	X	X
107_	TMW-M046	3	A	02/09/11	X	X
108_	TMW-J014	4	A	02/09/11	X	X
108_	TMW-D012	5	A	02/09/11	X	X
107_	TMWI042	6	A	02/09/11	X	X
108_	DUP-020911	7	A	02/09/11	X	X
---	FB020911	8FB	A	02/09/11	X	X

A = Aqueous Matrix

Total Samples = 8

All samples were received on the same day of collection. Samples were received on ice at recorded temperature of 0.4°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination.

Reported spike recoveries, duplicate precision values, and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

The concentration of Cr⁺⁶ added to the matrix spike was not as specified in the method (7196A, Sect. 7.3.1): "... The amount of spike added should double the concentration found in the original aliquot. Under no circumstances should the increase be less than 30 ug Cr(VI)/liter. ...".

- QA Action: Qualify all reported Cr+6 results as estimated "UJ"; potential bias magnitude and direction is indeterminate.

No positive Cr⁺⁶ result was reported for the field blank sample (FB020911).

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: ICP-MS tune, mass calibration and resolution checks, initial calibration linearity, CRQL sensitivity check, continuing calibration frequency and accuracy, internal standard recoveries, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported spike recoveries and duplicate precision values were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

Results for chromium (Cr), nickel (Ni) and vanadium (V) in sample 460-22930-3 (107-TMW-M046) were reported from a 20x dilution re-analysis, due to exceedance of the linear calibration range for these elements. All other target elements in this sample and all target elements in all other SDG samples were reported from initial 5x dilution runs.

No positive element results were reported for the field blank sample (FB020911).

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

SECTION F COLLOCATED SAMPLES

DUP020911-1 was identified as being collocated with 108_TMW_I042 (460-22930-6). Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	TMW_I042	D020911-1	%RPD
Chromium	4.1 J	4.4 J	0.30 *
Nickel	161	169	4.8
Antimony	ND	ND	nc
Thallium	ND	ND	nc
Vanadium	6.2	6.8	0.60 *
Cr (VI)	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >20%, <100% RPD for aqueous samples >5x CRQL values, and difference >±CRQL, <2x±CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

Dresdner-Robin

Mr. Douglas Neumann

06 June, 2011

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

20 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 and 108, Laboratory Job No. 460-22948-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22948-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample 108_D012_0.0 (22948-6) was not analyzed for Cr⁺⁶ or ICP metals; no reason was noted.

Site ID	Sample ID	Lab ID 460-22948-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
107_	M038_0.0	1	S	02/09/11	X	X
107_	M038_3.5	2	S	02/09/11	X	X
107_	M038_8.0	3	S	02/09/11	X	X
107_	M038_12.0	4	S	02/09/11	X	X
107_	M038_16.0	5	S	02/09/11	X	X
108_	D012_0.0	6	S	02/09/11	X	X
108_	D012_3.5	7	S	02/09/11	X	X
108_	D012_6.0	8	S	02/09/11	X	X
108_	D012_11.0	9	S	02/09/11	X	X
108_	D012_15.0	10	S	02/09/11	X	X
108_	D012_15.0	10MSS	S	02/09/11	X	X
108_	D012_19.0	11	S	02/09/11	X	X
108_	D012_19.0	11MSS	S	02/09/11	X	X
108_	D012_23.0	12	S	02/09/11	X	X
107_	M036_0.0	13	S	02/09/11	X	X
107_	M036_3.5	14	S	02/09/11	X	X
107_	M036_7.5	15	S	02/09/11	X	X
107_	M036_8.5	16	S	02/09/11	X	X
107_	M036_12.5	17	S	02/09/11	X	X
107_	M036_16.5	18	S	02/09/11	X	X
108_	D006_0.0	19	S	02/09/11	X	X
108_	D006_3.5	20	S	02/09/11	X	X
108_	D006_6.5	21	S	02/09/11	X	X
108_	D006_10.5	22	S	02/09/11	X	X
108_	D006_14.5	23	S	02/09/11	X	X
108_	D006_18.5	24	S	02/09/11	X	X
---	REP-020911-1	25	S	02/09/11	X	X
---	FB020911	26FB	A	02/09/11	X	X
107_	M044_0.5	27	S	02/09/11	X	X
107_	M044_3.5	28	S	02/09/11	X	X
107_	M044_7.5	29	S	02/09/11	X	X
107_	M044_11.5	30	S	02/09/11	X	X
107_	M044_15.5	31	S	02/09/11	X	X
107_	M042_0.5	32	S	02/09/11	X	X
107_	M042_3.5	33	S	02/09/11	X	X
107_	M042_7.5	34	S	02/09/11	X	X

Site ID	Sample ID	Lab ID 460-22948-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
107_	M042_8.5	35	S	02/09/11	X	X
107_	M042_12.5	36	S	02/09/11	X	X
107_	M042_16.5	37	S	02/09/11	X	X
107_	M040_0.5	38	S	02/09/11	X	X
107_	M040_3.5	39	S	02/09/11	X	X
107_	M040_7.5	40	S	02/09/11	X	X
107_	M040_8.5	41	S	02/09/11	X	X
107_	M040_12.5	42	S	02/09/11	X	X
107_	M040_16.5	43	S	02/09/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 43

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day after collection. Samples were received on ice at recorded temperatures of 4.0°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was not detected in Field Blank FB-1.

Matrix spike recoveries for soluble and insoluble Cr⁺⁶ in sample 460-22948-39 (107_M040_3.5) were below the allowable limit of 75% in both initial and re-analyses, with recoveries below 50%, as tabulated below.

Sample ID	Sol.Recov.	Insol.Recov.
22948-39	23%	38%
re-analysis	33%	57%

- QA Action: Qualify Cr⁺⁶ results in batch samples associated with 460-22948-39 (samples 29 – 43) as rejected, 'R', per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e). See Data Usability comments below.

- **Data Usability:** Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. The following associated batch samples were characterized as “Reducing” based upon the Method 3060A, Table 2 phase diagram: 460-22948- 30, -31, -36, -37, -38, -39, -40, -42 and -43; these samples are not likely to support the presence of Cr⁺⁶, or if positive, may be low-biased.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recoveries for chromium (Cr) and vanadium (V) in the matrix spike of sample 108_D012_11.0 (Lab ID# 460-22948-9) were below the limit of 75%, at 66% and 66%. The associated LCS recoveries for Cr and V were within acceptable limits, indicating analytical process control.

- **QA Action:** Qualify Cr and V results in associated samples 460-22948-1 through -9 (inclusive) as estimated, ‘UJ’ or ‘J’, with indication of low bias due to sample matrix effects.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported, with acceptable precision shown.

No positive element results were reported for the field blank sample (FB-1).

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a ‘field-performed’ analysis. The laboratory assigned all reported pH results an ‘HF’ qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light’s solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; refer to the data usability section above.

SECTION F
COLLOCATED SAMPLES

107_REP020911-1 was identified as being collocated with 107_M036_3.5 (460-22948-14). Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	M036_3.5	R020911-1	%RPD
Chromium	58.9	60.2	2.2
Nickel	29.2	34.5	5.3 *
Antimony	2.2	1.0	1.2 *
Thallium	ND	ND	nc
Vanadium	102	71.8	34.8
Cr (VI)	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

25 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-22995-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Total Metals (Cr, Ni, Sb, Tl, V)

pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-22995-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_-	Lab ID 460-22995-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
M034_0.0	1	S	02/10/11	X	X
M034_3.0	2	S	02/10/11	X	X
M034_3.5	3	S	02/10/11	X	X
M034_5.0	4	S	02/10/11	X	X
M034_7.5	5	S	02/10/11	X	X
M034_9.5	6	S	02/10/11	X	X
M034_13.5	7	S	02/10/11	X	X
M034_17.5	8	S	02/10/11	X	X
M032_0.0	9	S	02/10/11	X	X
M032_0.5	10	S	02/10/11	X	X
M032_1.5	11	S	02/10/11	X	X
M032_3.0	12	S	02/10/11	X	X
M032_7.0	13	S	02/10/11	X	X
M032_11.0	14	S	02/10/11	X	X
M030_0.0	15	S	02/10/11	X	X
M030_0.5	16	S	02/10/11	X	X
M030_2.5	17	S	02/10/11	X	X
M030_3.5	18	S	02/10/11	X	X
M030_7.5	19	S	02/10/11	X	X
M030_11.5	20	S	02/10/11	X	X
M028_0.0	21	S	02/10/11	X	X
M028_0.5	22	S	02/10/11	X	X
M028_1.0	23	S	02/10/11	X	X
M028_3.5	24	S	02/10/11	X	X
M028_7.5	25	S	02/10/11	X	X
M028_11.5	26	S	02/10/11	X	X
M026_0.5	27	S	02/10/11	X	X
M026_3.0	28	S	02/10/11	X	X
M026_4.0	29	S	02/10/11	X	X
M026_8.0	30	S	02/10/11	X	X
M026_12.0	31	S	02/10/11	X	X
M026_0.0	32	S	02/10/11	X	X
M024_0.0	33	S	02/10/11	X	X
M024_0.5	34	S	02/10/11	X	X
M024_2.0	35	S	02/10/11	X	X
M024_3.5	36	S	02/10/11	X	X
M024_7.5	37	S	02/10/11	X	X
M024_15.5	38	S	02/10/11	X	X
REP-021011-1	39	S	02/10/11	X	X
FB021011	40	A	02/10/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 40

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day following collection. Samples were received on ice at recorded temperature of 2.6 °C, in good condition.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, duplicate precision, and matrix and post-spike recoveries. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was reported positive in Field Blank FB-021011, at 1.9 J ug/L, which is equivalent to 0.076 mg/Kg (nominal). The following samples exhibited positive results which were $>3x$ but $<10x$ the field blank result: 460-22995- 4, -6, -19 and -31.

- QA Action: Qualify Cr⁺⁶ results in above-noted samples as estimated, 'J', with indication of high bias due to field blank contamination.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike and LCS recoveries and serial dilution sample precision, *with the exceptions detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The precision (RPD) value for chromium (Cr) between lab replicates of sample 460-22995-22 was reported above the limit of 20%, at 29%.

- QA Action: Qualify Cr results in associated field samples (460-22995-6 through -25) as estimated values 'J', with indeterminate bias direction.

It is noted that no post-digestion spike samples were reported for this delivery group.

No positive element results were reported for the field blank sample (FB-021011).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

Sample REP-021011-1 was not identified with a corresponding collocated field sample.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

26 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 and 108, Laboratory Job No. 460-23018-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-23018-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Site ID	Sample ID	Lab ID 460-23018-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
107_	M022_0.0	1	S	02/11/11	X	X
107_	M022_1.0/2.0	2	S	02/11/11	X	X
107_	M022_4.0/4.5	3	S	02/11/11	X	X
107_	M022_4.5	4	S	02/11/11	X	X
107_	M022_8.5	5	S	02/11/11	X	X
107_	M022_12.5	6	S	02/11/11	X	X
---	FB021111	7	A	02/11/11	X	X
107_	REP021111-1	8	S	02/11/11	X	X
108_	REP021111-2	9	S	02/11/11	X	X
108_	REP021111-3	10	S	02/11/11	X	X
107_	M020_0.0	11	S	02/11/11	X	X
107_	M020_3.5	12	S	02/11/11	X	X
107_	M020_7.5	13	S	02/11/11	X	X
107_	M020_11.5	14	S	02/11/11	X	X
107_	M020_1.0/1.2	15	S	02/11/11	X	X
107_	M020_2.5	16	S	02/11/11	X	X
107_	M020_3.0	17	S	02/11/11	X	X
108_	K018_0.0	18	S	02/11/11	X	X
108_	K018_4.5	19	S	02/11/11	X	X
108_	K018_8.5	20	S	02/11/11	X	X
108_	K018_12.5	21	S	02/11/11	X	X
108_	I018_0.0	22	S	02/11/11	X	X
108_	I018_4.5	23	S	02/11/11	X	X
108_	I018_8.5	24	S	02/11/11	X	X
108_	I018_12.5	25	S	02/11/11	X	X
108_	G018_0.0	26	S	02/11/11	X	X
108_	G018_3.5	27	S	02/11/11	X	X
108_	G018_5.5	28	S	02/11/11	X	X
108_	G018_9.5	29	S	02/11/11	X	X
108_	G018_13.5	30	S	02/11/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 30

Bold Type indicates sample taken as a Batch QC sample

All samples were received on the same day of collection. Samples were received on ice at recorded temperature of 3.2°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were re-analyzed at dilution in order to bring absorbance values into calibrated range; reported RL values were adjusted based on dilution used.

Cr^{+6} was not detected in Field Blank FB021111.

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recovery for antimony in the matrix spike of sample 108_I018_4.5 (Lab ID# 460-23018-23) was below the limit of 75%, at 62%. The associated LCS recoveries for Sb were within acceptable limits, indicating analytical process control.

- QA Action: Qualify Sb results in associated samples 460-23018-23 through -30 (inclusive) as estimated, 'UJ' or 'J', with indication of low bias due to sample matrix effects.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

No positive element results were reported for the field blank sample (FB-1).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges.

SECTION F COLLOCATED SAMPLES

REP021111-1, -2 and -3 were identified as being collocated with 107_M020_7.5, 108_K018_8.5, and 108_G018_3.5 (460-23018-13, -20 and -27), respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	M020_7.5	R021111-1	%RPD	K018_8.5	R021111-2	%RPD	G018_3.5	R021111-3	%RPD
Chromium	21.6	24.5	12.6	14.3	13.6	5.0	16.7	15.5	7.5
Nickel	12.0	12.5	0.5 *	13.7	12.5	1.2 *	17.9	16.6	1.3 *
Antimony	ND	ND	nc	ND	ND	nc	ND	ND	nc
Thallium	ND	ND	nc	ND	ND	nc	ND	ND	nc
Vanadium	17.4	18.7	1.3 *	20.8	19.7	1.1 *	23.0	20.7	2.3 *
Cr (VI)	1.2 J	1.2 J	0	ND	ND	nc	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

28 May, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-23077-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-23077-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_	Lab ID 460-23077-	Matrix	Date Collected	Analysis	
				Hex Cr	Metals
E031_0.0	1	S	02/14/11	X	X
E031_3.5	2	S	02/14/11	X	X
E031_6.5	3	S	02/14/11	X	X
E031_11.5	4	S	02/14/11	X	X
E031_15.5	5	S	02/14/11	X	X
E031_19.5	6	S	02/14/11	X	X
REP021411-1	7	S	02/14/11	X	X
E029_0.0	8	S	02/14/11	X	X
E029_3.5	9	S	02/14/11	X	X
E029_7.5	10	S	02/14/11	X	X
E029_10.5	11	S	02/14/11	X	X
E029_14.5	12	S	02/14/11	X	X
E029_18.5	13	S	02/14/11	X	X
E028a_0.0	14	S	02/14/11	X	X
E028a_3.5	15	S	02/14/11	X	X
E028a_6.0	16	S	02/14/11	X	X
E028a_9.0	17	S	02/14/11	X	X
E028a_10.0	18	S	02/14/11	X	X
E028a_14.0	19	S	02/14/11	X	X
E028a_18.0	20	S	02/14/11	X	X
REP021411-2	21	S	02/14/11	X	X
E027_0.0	22	S	02/14/11	X	X
E027_2.5	23	S	02/14/11	X	X
E027_7.5	24	S	02/14/11	X	X
E027_11.5	25	S	02/14/11	X	X
E027_15.5	26	S	02/14/11	X	X
E026a_0.0	27	S	02/14/11	X	X
E026a_4.5	28	S	02/14/11	X	X
E026a_7.0	29	S	02/14/11	X	X
E026a_11.0	30	S	02/14/11	X	X
E026a_15.0	31	S	02/14/11	X	X
REP021411-3	32	S	02/14/11	X	X
D023_0.0	33	S	02/14/11	X	X
D023_3.5	34	S	02/14/11	X	X
D023_7.0	35	S	02/14/11	X	X
D023_11.0	36	S	02/14/11	X	X
D023_15.0	37	S	02/14/11	X	X
FB021411	38FB	A	02/14/11	X	X

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 38
Bold Type indicates sample taken as a Batch QC sample

All samples were received one day following collection. Samples were received on ice at recorded temperature of 2.7°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were re-analyzed at dilution in order to bring absorbance values into calibrated range; reported RL values were adjusted based on dilution used.

Cr⁺⁶ was not detected in Field Blank FB021411.

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

The recoveries for antimony in the matrix spikes of samples 108_I018_4.5 (Lab ID# 460-23018-23) and 107_E027_15.5 (460-23077-26) were below the limit of 75%, at 62% and 73%, respectively. The associated LCS recoveries for Sb were within acceptable limits, indicating analytical process control.

- QA Action: Qualify Sb results in associated samples 460-23077- 1 through -3 and -15 through -34 (inclusive) as estimated, 'UJ' or 'J', with indication of low bias due to sample matrix effects.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

No positive element results were reported for the field blank sample (FB-1).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP021411-1, -2 and -3 were identified as being collocated with 107_E031_3.5, E031_15.5, and E027_2.5 (460-23077-2, -5 and -23), respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	E031_3.5	R021411-1	%RPD	E031_15.5	R021411-2	%RPD	E027_2.5	R021411-3	%RPD
Chromium	18.6	19.6	5.2	15.0	16.6	10.1	116	110	5.3
Nickel	49.9	53.4	6.8	18.3	24.8	6.5 *	17.0	18.3	1.3 *
Antimony	ND	ND	nc	ND	ND	nc	ND	ND	nc
Thallium	ND	ND	nc	ND	ND	nc	ND	ND	nc
Vanadium	19.8	19.9	0.1 *	20.1	25.1	5.0 *	55.6	55.3	0.3 *
Cr (VI)	ND	ND	nc	ND	ND	nc	1.0 J	1.7 J	0.7 *

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

01 June, 2011
Revised 22 June, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 and 108, Laboratory Job No. 460-23116-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 and 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-23116-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Site ID	Sample ID	Lab ID 460-23116-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
108_	D014_0.0	1	S	02/15/11	X	X
108_	D014_3.5	2	S	02/15/11	X	X
108_	D014_6.5	3	S	02/15/11	X	X
108_	D014_10.5	4	S	02/15/11	X	X
108_	D014_14.5	5	S	02/15/11	X	X
108_	REP021511-1	6	S	02/15/11	X	X
108_	F014_0.0	7	S	02/15/11	X	X
108_	F014_1.5	8	S	02/15/11	X	X
108_	F014_5.5	9	S	02/15/11	X	X
108_	F014_9.5	10	S	02/15/11	X	X
108_	E018_0.0	11	S	02/15/11	X	X
108_	E018_2.5	12	S	02/15/11	X	X
108_	E018_6.5	13	S	02/15/11	X	X
108_	E018_10.5	14	S	02/15/11	X	X
107_	D021_0.0	15	S	02/15/11	X	X
107_	D021_2.5	16	S	02/15/11	X	X
107_	D021_6.5	17	S	02/15/11	X	X
107_	D021_10.5	18	S	02/15/11	X	X
108_	REP021511-2	19	S	02/15/11	X	X
107_	D025_0.0	20	S	02/15/11	X	X
107_	D025_3.5	21	S	02/15/11	X	X
107_	D025_7.5	22	S	02/15/11	X	X
107_	D025_11.5	23	S	02/15/11	X	X
107_	D025_15.5	24	S	02/15/11	X	X
107_	D025_19.5	25	S	02/15/11	X	X
108_	D016_0.0	26	S	02/15/11	X	X
108_	D016_2.5	27	S	02/15/11	X	X
108_	D016_6.5	28	S	02/15/11	X	X
108_	D016_10.5	29	S	02/15/11	X	X
---	FB021511	30FB	A	02/15/11	X	X
108_	REP021511-3	31	S	02/15/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 31

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperature of 3.3°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr^{+6} was not detected in Field Blank FB021511.

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Samples 460-23116-12 through -29 and -31 exhibited incorrectly reported Result, RL, MDL and Units values, as raw concentration values in mg/L, rather than as mg/Kg dry-weight values. Therefore, the reported values are under-reported by a nominal factor of 50x in both the laboratory report and the associated EDD results summary.

- **QA Action:** Reported results for associated samples 460-23116-12 through -29 and -31 were re-calculated by the reviewer and reported to client. The laboratory was contacted and requested to determine and resolve the cause of the erroneous values via corrective action process, and to correct and re-issue the affected report sections.
 - *Post-Script:* The laboratory re-digested and re-analyzed the affected samples noted above on 06/08/11, and submitted a revised report including the re-analysis results and associated batch calibrations and QC samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision, *with the exception detailed below*. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) were randomly verified from the raw data with no disparities between reported and calculated results found. Exception: see QA Action above.

The recovery for antimony in the matrix spike of sample 108_F014_9.5 (Lab ID# 460-23166-10) was below the limit of 75%, at 67%. The associated LCS recovery for Sb was within acceptable limits, indicating analytical process control.

The recovery for antimony in the matrix spike of sample 108_E018_2.5 (Lab ID# 460-23166-12) was below the limit of 75%, at 26%. The associated LCS recovery for Sb was within acceptable limits, indicating analytical process control.

- QA Action: Qualify Sb results in associated samples 460-23116-1 through -11 (inclusive) as estimated, 'UJ' or 'J', with indication of low bias due to sample matrix effects.
- QA Action: *Qualify Sb results in associated samples 460-23116-12 through -29 (inclusive) and -31 as estimated, 'UJ' or 'J', with indication of low bias due to sample matrix effects.*

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

No positive element results were reported for the field blank sample (FB021511).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP021511-1, -2 and -3 were identified as being collocated with 108_D014_0.0, 108_F014_9.5, and 108_E018_2.5 (460-23116-1, -10 and -12), respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	D014_0.0	R021511-1	%RPD	F014_9.5	R021511-2	%RPD	E018_2.5	R021511-3	%RPD
Chromium	24.8	22.7	8.8	15.1	17.0	11.6	18.9	15.9	17.2
Nickel	15.8	14.0	1.8 *	10.8	11.5	0.7 *	13.7	13.5	0.20 *
Antimony	ND	ND	nc	ND	ND	nc	ND	ND	nc
Thallium	ND	ND	nc	ND	ND	nc	ND	ND	nc
Vanadium	30.5	36.4	4.9 *	16.4	20.8	4.4 *	23.5	20.4	3.1 *
Cr (VI)	ND	ND	nc	ND	ND	nc	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

NB - The Total Metals samples re-analyzed on 06/08/11 exhibited concentrations which differed from the original reported results (as calculated from the raw data by the reviewer) by a relatively wide margin; the newer results were typically lower than those originally reported. Since there were no significant QC or analytical process anomalies noted in the original data (with the exception of incorrect final reporting, as discussed above), a conservative approach would suggest utilization of the original data (as correctly revised, reported and qualified) for regulatory compliance purposes.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

04 June, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 & 108, Laboratory Job No. 460-23391-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-23391-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Site ID	Sample ID	Lab ID 460-23391-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
107_	D019_0.0	1	S	02/23/11	X	X
107_	D019_4.0	2	S	02/23/11	X	X
107_	D019_8.0	3	S	02/23/11	X	X
107_	D019_12.0	4	S	02/23/11	X	X
108_	M018_0.0	5	S	02/23/11	X	X
108_	M018_4.0	6	S	02/23/11	X	X
108_	M018_8.0	7	S	02/23/11	X	X
108_	M018_12.0	8	S	02/23/11	X	X
108_	M018_3.5	9	S	02/23/11	X	X
108_	M006_0.0	10	S	02/23/11	X	X
108_	M006_4.0	11	S	02/23/11	X	X
108_	M006_8.0	12	S	02/23/11	X	X
108_	M006_12.0	13	S	02/23/11	X	X
108_	C002_0.0	14	S	02/23/11	X	X
108_	C002_4.0	15	S	02/23/11	X	X
108_	C002_8.0	16	S	02/23/11	X	X
108_	C002_12.0	17	S	02/23/11	X	X
108_	B006_0.0	18	S	02/23/11	X	X
108_	B006_3.5	19	S	02/23/11	X	X
108_	B006_7.5	20	S	02/23/11	X	X
108_	B006_11.5	21	S	02/23/11	X	X
107_	REP-022311-1	22	S	02/23/11	X	X
108_	B008_0.0	23	S	02/23/11	X	X
108_	B008_4.5	24	S	02/23/11	X	X
108_	B008_8.5	25	S	02/23/11	X	X
108_	B008_12.5	26	S	02/23/11	X	X
108_	REP-022311-2	27	S	02/23/11	X	X
---	FB022311	28FB	A	02/23/11	X	X

S = Non-Aqueous Matrix

Total Samples = 28

A = Aqueous Matrix

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperature of 3.4°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination.

Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

No positive Cr⁺⁶ result was reported for the field blank sample (FB022311).

SECTION D
Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported spike recoveries, duplicate precision values, reported % moisture (% solids) were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

No positive element results were reported for the field blank sample (FB022311).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP022311-1 and -2 were identified as being collocated with 107_D019_8.0 and 108_M018_12.0 (460-23391-3 and -8), respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	D019_8.0	R022311-1	%RPD	M018_12.0	R022311-2	%RPD
Chromium	20.7	23.9	14.3	12.7	15.9	22.4
Nickel	14.0	13.7	0.3 *	10.5	12.2	1.7 *
Antimony	ND	ND	nc	ND	ND	nc
Thallium	ND	ND	nc	ND	ND	nc
Vanadium	29.4	32.9	3.5 *	18.3	20.1	1.8 *
Cr (VI)	ND	4.6	4.6 *	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

08 June, 2011

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Sites 107 & 108, Laboratory Job No. 460-23410-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 & 108

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Cr, Ni, Sb, Tl, V)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-23410-1

Matrix: Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.
487 Shoddy Hollow Road
Middletown, New York 10940

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 method 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3010A and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Site ID	Sample ID	Lab ID 460-23410-	Matrix	Date Collected	Analysis	
					Hex Cr	Metals
107_	TMW-D019	1	A	02/24/11	X	X
108_	TMW-M018	2	A	02/24/11	X	X
108_	DUP	3	A	02/24/11	X	X
	Field Blank	4	A	02/24/11	X	X
108_	TMW-M006	5	A	02/24/11	X	X
108_	TMW-B008	6	A	02/24/11	X	X
108_	TMW-C002	7	A	02/24/11	X	X

A = Aqueous Matrix

Total Samples = 7

All samples were received on the same day of collection. Samples were received on ice at recorded temperature of 1.1°C.

SECTION C Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix) were met for all samples. Samples 108-TMW- M006, -B008 and -C002 were analyzed at 2x, 5x and 2x dilutions, respectively, due to interferences present in the samples. These samples were reported with appropriate RL elevations.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks were free of contamination.

Reported spike recoveries, duplicate precision values, and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

The concentration of Cr⁺⁶ added to the matrix spike was not as specified in the method (7196A, Sect. 7.3.1): "... The amount of spike added should double the concentration found in the original aliquot. Under no circumstances should the increase be less than 30 ug Cr(VI)/liter. ...".

- QA Action: Qualify all reported Cr+6 results as estimated "UJ" or "J"; potential bias magnitude and direction is indeterminate.

No positive Cr⁺⁶ result was reported for the field blank sample.

SECTION D Total Metals

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: ICP-MS tune, mass calibration and resolution checks, initial calibration linearity, CRQL sensitivity check, continuing calibration frequency and accuracy, internal standard recoveries, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported spike recoveries and duplicate precision values were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference.

All target elements in all samples were reported from initial 5x dilution runs.

No positive element results were reported for the field blank sample.

SECTION E pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

SECTION F COLLOCATED SAMPLES

DUP (022411) was identified as being collocated with 108_TMW_M018 (460-23410-2). Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	TMW_M018	D022411	%RPD
Chromium	242	217	10.9
Nickel	17.1	16.3	0.80 *
Antimony	4.1	3.8	0.30 *
Thallium	ND	ND	nc
Vanadium	16.8	15.3	1.5 *
Cr (VI)	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >20%, <100% RPD for aqueous samples >5x CRQL values, and difference >±CRQL, <2x±CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

Dresdner-Robin

Mr. Douglas Neumann

08 June, 2011

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

19 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-27331-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-27331-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID	Lab ID	Matrix	Date Collected	Analysis
				Hex Cr
107_-	460-27331-			
I039_10.0	1	S	06/06/11	X
I039_11.0	2	S	06/06/11	X
I039_12.0	3	S	06/06/11	X
J038_7.0	4	S	06/06/11	X
J038_8.0	5	S	06/06/11	X
J038_10.0	6	S	06/06/11	X
J038_11.0	7	S	06/06/11	NR
J038_12.0	8	S	06/06/11	X
REP060611-1	9	S	06/06/11	X
I038N_7.0	10	S	06/06/11	X
I038N_6.5	11	S	06/06/11	X
I038N_8.0	12	S	06/06/11	X
I038N_10.0	13	S	06/06/11	X
I038N_11.0	14	S	06/06/11	X
I038N_12.0	15	S	06/06/11	X
I038E_7.0	16	S	06/06/11	X
I038E_8.0	17	S	06/06/11	X
I038E_10.0	18	S	06/06/11	X
I038E_12.0	19	S	06/06/11	X
I038_11.0	20	S	06/06/11	X
I039_7.0	21	S	06/06/11	X
I039_8.0	22	S	06/06/11	X
I037_10.0	23	S	06/06/11	X
I037_11.0	24	S	06/06/11	X
I037_12.0	25	S	06/06/11	X
REP060611-2	26	S	06/06/11	X
I038W_6.5	27	S	06/06/11	X
I038W_7.0	28	S	06/06/11	X
I038W_8.0	29	S	06/06/11	X
I038W_10.0	30	S	06/06/11	X
I038W_12.0	31	S	06/06/11	X
GO36N_5.0	32	S	06/06/11	X
GO36N_6.0	33	S	06/06/11	X
I038W_11.0	34	S	06/06/11	X
H038_7.0	35	S	06/06/11	X
H038_8.0	36	S	06/06/11	X
H038_10.0	37	S	06/06/11	X
H038_11.0	38	S	06/06/11	X
H038_12.0	39	S	06/06/11	X
IN38S_7.0	40	S	06/06/11	X
I038S_8.0	41	S	06/06/11	X
I038S_10.0	42	S	06/06/11	X

Sample ID	Lab ID		Date	Analysis
I038S_11.0	43	S	06/06/11	X
I038S_12.0	44	S	06/06/11	X
I037_7.0	45	S	06/06/11	X
I037_8.0	46	S	06/06/11	X
H036_6.0	47	S	06/06/11	X
H036_5.0	48	S	06/06/11	X
REPO60611-3	49	S	06/06/11	X
FB060611	50	A	06/06/11	X

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 50

NR = not reported

Bold Type indicates sample taken as a Batch QC sample

All samples were received one day from collection. Samples were received on ice at recorded temperature of 2.1°C.

SECTION C
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination.

Reported spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Cr⁺⁶ was reported positive for the field blank sample (FB060611) at 1.7 J ug/L, and in the associated aqueous method blank at 2.9 ug/L. Per NJDEP guidance, an aqueous prep blank is not required for the field blank if only soil samples are analyzed. It is the reviewer's opinion that the reported field blank contamination is due to the associated prep blank, and since the associated soil samples method blanks were free of contamination, no QA action is necessary.

SECTION D
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. Since the samples were chilled on receipt at the lab, and analyzed within one day of receipt, no data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly

verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample spike recoveries are outside acceptable recovery ranges.

SECTION E
COLLOCATED SAMPLES

REP060611-1, -2 and -3 were identified as being collocated with (107_) I038E_7.0, J038-11.0 and I037_12.0, respectively. Precision results (as %RPD) are tabulated below. Note: ND = Not Detected ; nc = not calculated ; NR = Not Reported ; * = absolute difference is shown if either sample <5x CRQL

	I038E 7.0	R60611-1	%RPD	J038 11.0	R60611-2	%RPD	I037 12.0	R60611-3	%RPD
Cr (VI)	2.4	0.96	1.4 *	NR	2.4 U	nc	2.4 U	2.4 U	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

20 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-27429-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

Total Vanadium (V)

pH / Eh ; ORP

Report No.: 460-27429-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of ‘Total Samples’ listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107__	Lab ID 460-27429-	Matrix	Date Collected	Analysis	
				Hex. Cr	Metals (V)
G036E_5.0	1	S	06/07/11	X	
G036E_6.0	2	S	06/07/11	X	
G037_3.5	3	S	06/07/11	X	
G037_5.0	4	S	06/07/11	X	
G037_6.0	5	S	06/07/11	X	
G036S_3.5	6	S	06/07/11	X	
G036S_5.0	7	S	06/07/11	X	
G036S_6.0	8	S	06/07/11	X	
F036_3.5	9	S	06/07/11	X	X
F036_5.0	10	S	06/07/11	X	X
F036_6.0	11	S	06/07/11	X	X
<i>REP060711-1</i>	12	S	06/07/11	X	X
F039_4.0	13	S	06/07/11	X	
F039_5.0	14	S	06/07/11	X	
F039_6.0	15	S	06/07/11	X	
F039_7.5	16	S	06/07/11	X	
F039_8.5	17	S	06/07/11	X	
F039_4.5	18	S	06/07/11	X	
F040W_5.0	19	S	06/07/11	X	
F040W_6.0	20	S	06/07/11	X	
F040W_6.5	21	S	06/07/11	X	
F040W_7.5	22	S	06/07/11	X	
F039_6.5	23	S	06/07/11	X	
G036W_4.5	24	S	06/07/11	X	
G036W_5.0	25	S	06/07/11	X	
G036W_6.0	26	S	06/07/11	X	
G035_5.0	27	S	06/07/11	X	
G035_6.0	28	S	06/07/11	X	
F038_6.0	29	S	06/07/11	NR	X
F040W_9.5	30	S	06/07/11	X	
<i>REP060711-2</i>	31	S	06/07/11	X	X
FB060711	32FB	A	06/07/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 32

NR = not reported

Bold Type indicates sample taken as a Batch QC sample*Italic type* indicates samples are collocated field duplicates

All samples were received one day from collection. Samples were received on ice at recorded temperature of 2.7°C.

SECTION C
Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix) were met for all soil samples. The aqueous field blank (FB060711) was analyzed beyond the allowable holding time of 24 hours, but < 48 hours from collection; the reported result for this sample was flagged as estimated 'UJ', with indication of potential low bias on the reported RL value due to holding time exceedance.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The recovery of Cr⁺⁶ in the Post-Spike of batch QC sample F036_3.5 (460-27429-9) exceeded the upper limit of 115%, at 147%; re-analysis of the re-spiked sample was 144%. The positive results for Cr⁺⁶ in associated batch samples (460-27429-1-9) were flagged as estimated 'J', with indication of high bias due to matrix effects.

SECTION D
Total Metals (V)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. The reported QC batch parent sample was not from this site's samples and may not be representative of this SDG's sample matrix characteristics, and were not considered for qualification. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference. No positive element results were reported for the field blank sample (FB060711).

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP060711-1 and -2 were identified as being collocated with 107_G036E_6.0 and 107_G035_5.0, respectively. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP060711-1	G036E_6.0	%RPD	REP060711-1	G035_5.0	%RPD
Cr (VI)	4.3	6.5	2.2*	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

23 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-27475-2

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

Total Vanadium (V)

pH / Eh ; ORP

Report No.: 460-27475-2

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of ‘Total Samples’ listed below is exclusive of associated QC samples (MS / MD).

Sample ID 107_-	Lab ID 460-27475-	Matrix	Date Collected	Analysis	
				Hex. Cr	Metals (V)
F040E_5.0	1	S	06/08/11	X	
F040E-5.5	2	S	06/08/11	X	
F040E-6.0	3	S	06/08/11	X	
F040E-6.5	4	S	06/08/11	X	
F040E-7.5	5	S	06/08/11	X	
F041_5.0	6	S	06/08/11	X	
F041-5.5	7	S	06/08/11	X	
F041-6.0	8	S	06/08/11	X	
F041-7.5	9	S	06/08/11	X	
F041-6.5	10	S	06/08/11	X	
J038_11.0	11	S	06/08/11	X	
F040N_6.0	12	S	06/08/11	X	
F040N_6.5	13	S	06/08/11	X	
F040N_7.5	14	S	06/08/11	X	
<i>F040S_3.5</i>	15	S	06/08/11	X	X
F040S_4.5	16	S	06/08/11	X	X
F040S_6.0	17	S	06/08/11	X	X
F040S_6.5	18	S	06/08/11	X	X
F040S_7.5	19	S	06/08/11	X	X
<i>REP060811-1</i>	20	S	06/08/11	X	X
FB060811	21FB	A	06/08/11	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 21

Bold Type indicates sample taken as a Batch QC sample

Italic type indicates samples are collocated field duplicates

All samples were received one day from collection. Samples were received on ice at recorded temperature of -0.2°C. No sample condition issues were noted in the sample receipt log ; no QA action was taken.

SECTION C

Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr^{+6} results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr^{+6} concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The recovery of Cr^{+6} in the Post-Spike of batch QC sample F040E_5.0 (460-27475-1) exceeded the upper limit of 115%, at 120%; re-analysis of the re-spiked sample recovered within limits at 96%. No data qualifiers were necessary.

The initial matrix spike recovery for soluble Cr^{+6} was low due to the sample native concentration $>4x$ spike-added concentration (246 mg/Kg vs. 43 mg/Kg spiked). The sample was re-spiked and re-analyzed at appropriate concentration (541 mg/Kg) and recovered within limits at 77%. No QA action was necessary. It is noted that the batch QC sample F040E_5.0 (460-27475-1), and all other SDG samples, indicated oxidizing tendency based on measured ORP values. The parent sample was subsequently analyzed for sulfide (S^-), TOC and ferrous iron (Fe^{++}). TOC result was positive (31000 mg/Kg), and S^- and Fe^{++} results were non-detect. It is presumed based on these ancillary results that the soil matrix is of an oxidizing nature that would not tend to inhibit the presence of hexavalent chromium.

SECTION D Total Metals (V)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. The reported QC batch parent sample was not from this site's samples and may not be representative of this SDG's sample matrix characteristics, and was not considered for qualification. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

It is noted that no post-digestion spike samples were reported for this delivery group. Serial dilution samples were reported; no results in these samples exceeded the applicable threshold for calculation of percent difference. No positive element results were reported for the field blank sample (FB060711).

SECTION E pH / Eh (ORP) / Ferrous Iron / Sulfide / TOC

Samples for pH analysis and Fe^{++} were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH and Fe^{++} results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. All samples were characterized as "Oxidizing" based on ORP plots on the phase diagram. These values are only used for data assessment purposes when Cr^{+6} sample matrix spike recoveries are outside acceptable recovery ranges.

Matrix spike recoveries for sulfide and ferrous iron were below the respective lower acceptance limits of 90% and 81%, at 13% and 1%. LCS recoveries were within limits for these analytes, indicating acceptable analytical process control. Reported results for sulfide and ferrous iron in parent sample F040E_5.0 (460-27475-1) were flagged as estimated RL values (UJ), with indication of low bias due to sample matrix effects. Repeat analyses confirmed the original low recoveries.

SECTION F
COLLOCATED SAMPLES

REP060811-1 was identified as being collocated with 107_F040S_3.5. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL

	REP060811-1	F040S_3.5	%RPD
Vanadium	18.7	17.9	0.8*
Cr (VI)	ND	ND	nc

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

24 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 108, Laboratory Job No. 460-27543-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 108

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

pH / Eh ; ORP

Report No.: 460-27543-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of ‘Total Samples’ listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 108_	Laboratory ID: 460-27543-	Matrix	Date Collected	Analysis Hex. Cr
M018_E	1	S	06/10/11	X
M018_S	2	S	06/10/11	X
<i>M018_W</i>	3	S	06/10/11	X
M018_N	4	S	06/10/11	X
<i>REP_061011-1</i>	5	S	06/10/11	X
FB061011	6FB	A	06/10/11	X

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 6

NR = not reported

Bold Type indicates sample taken as a Batch QC sample

Italic type indicates samples are collocated field duplicates

All samples were received on the same day as collection. Samples were received on ice at recorded temperature of 6.0°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 189) indicated that no custody seal was present on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Soluble and insoluble Cr⁺⁶ spike recoveries in batch QC sample 108-M018_E (Lab ID: 460-27543-1) were below the allowable limit of 75% (at 1% and 12%, respectively); sample re-digestion and re-analysis was subsequently performed on all samples, with the original QC batch parent sample presenting recoveries comparable to the initial results. The post-verification spike recoveries were below the allowable limit of 85% (at 30% and 37%). The associated LCS recoveries for Cr⁺⁶ were within acceptable limits, indicating analytical process control.

- QA Action: Reported Cr⁺⁶ results in all soil samples are rejected, 'R', per the guidance contained in NJDEP, SOP No. 5.A.10, Rev. 3, Sect. VI.(D)7.D.8)e).

The data user is referred to the attached Cr⁺⁶ report and Data Usability comments below.

- Data Usability:
 - 1) Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. Numerous batch samples including the spike parent were characterized as “Reducing” based upon the Method 3060A, Table 2 phase diagram; these samples are not expected to support the presence of Cr⁺⁶, or if positive, may be low-biased.
 - 2) Sulfide screen, ferrous iron and TOC analyses were performed on the batch QC parent sample in order to provide further information regarding sample matrix ReDox characteristics.

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a ‘field-performed’ analysis. The laboratory assigned all reported pH results an ‘HF’ qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light’s solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP061011-1 was identified as being collocated with 108_M018_W. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP061011-1	M018_W	%RPD
Cr (VI)	11.9	8.8	3.1*

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user’s’ review of these data.

Dresdner-Robin Mr. Douglas Neumann

24 January, 2012

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

24 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 108, Laboratory Job No. 460-27543-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 108

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: TestAmerica Laboratories, Inc.

pH / Eh ; ORP

Report No.: 460-27543-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of ‘Total Samples’ listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 108_	Laboratory ID: 460-27543-	Matrix	Date Collected	Analysis Hex. Cr
M018_E	1	S	06/10/11	X
M018_S	2	S	06/10/11	X
<i>M018_W</i>	3	S	06/10/11	X
M018_N	4	S	06/10/11	X
<i>REP_061011-1</i>	5	S	06/10/11	X
FB061011	6FB	A	06/10/11	X

S = Non-Aqueous Matrix
A = Aqueous Matrix

Total Samples = 6

NR = not reported

Bold Type indicates sample taken as a Batch QC sample

Italic type indicates samples are collocated field duplicates

All samples were received on the same day as collection. Samples were received on ice at recorded temperature of 6.0°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 189) indicated that no custody seal was present on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C

Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

Soluble and insoluble Cr⁺⁶ spike recoveries in batch QC sample 108-M018_E (Lab ID: 460-27543-1) were below the allowable limit of 75% (at 1% and 12%, respectively); sample re-digestion and re-analysis was subsequently performed on all samples, with the original QC batch parent sample presenting recoveries comparable to the initial results. The post-verification spike recoveries were below the allowable limit of 85% (at 30% and 37%). The associated LCS recoveries for Cr⁺⁶ were within acceptable limits, indicating analytical process control.

- QA Action: Reported Cr⁺⁶ results in all soil samples are rejected, 'R', per the guidance contained in NJDEP, SOP No. 5.A.10, Rev. 3, Sect. VI.(D)7.D.8)e).

The data user is referred to the attached Cr⁺⁶ report and Data Usability comments below.

- Data Usability:
 - 1) Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. Numerous batch samples including the spike parent were characterized as “Reducing” based upon the Method 3060A, Table 2 phase diagram; these samples are not expected to support the presence of Cr⁺⁶, or if positive, may be low-biased.
 - 2) Sulfide screen, ferrous iron and TOC analyses were performed on the batch QC parent sample in order to provide further information regarding sample matrix ReDox characteristics.

SECTION E
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a ‘field-performed’ analysis. The laboratory assigned all reported pH results an ‘HF’ qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light’s solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION F
COLLOCATED SAMPLES

REP061011-1 was identified as being collocated with 108_M018_W. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP061011-1	M018_W	%RPD
Cr (VI)	11.9	8.8	3.1*

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION G
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user’s’ review of these data.

Dresdner-Robin Mr. Douglas Neumann

24 January, 2012

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

24 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 108, Laboratory Job No. 460-27904-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 108

Fractions

Hexavalent chromium (Cr⁺⁶)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-27904-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 108_	Laboratory ID: 460-27904-	Matrix	Date Collected	Analysis Hex. Cr
M018_S_2.5	1	S	06/21/11	X
M018_W_2.5	2	S	06/21/11	X
M018_N_2.0	3	S	06/21/11	X
<i>M018_E_2.5</i>	4	S	06/21/11	X
<i>REP_062111</i>	5	S	06/21/11	X
FB062111	6FB	A	06/21/11	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 6

NR = not reported

Bold Type indicates sample taken as a Batch QC sample*Italic type* indicates samples are collocated field duplicates

All samples were received on the same day as collection. Samples were received on ice at recorded temperature of 3.5°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 124) did not indicate the presence of a custody seal on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C

Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found.

The precision value (expressed as RPD) for sample 108_M018_N_2.0 (Lab ID: 460-27904-3) and its laboratory replicate exceeded the method limit of 20 (at 33).

- QA Action: Reported positive Cr⁺⁶ results in soil samples are flagged as estimated 'J', with indeterminate bias direction.

SECTION D

pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION E
COLLOCATED SAMPLES

REP062111-1 was identified as being collocated with 108_M018_E_2.5. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP062111-1	M018_E_2.5	%RPD
Cr (VI)	6.9	6.0	0.9*

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

25 January, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 108, Laboratory Job No. 460-28340-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 108

Fractions

Hexavalent chromium (Cr⁺⁶)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-28340-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 108_	Laboratory ID: 460-28340-	Matrix	Date Collected	Analysis Hex. Cr
<i>M018-N-07011</i>	1	S	07/01/11	X
<i>REP_070111</i>	2	S	07/01/11	X
FB070111	3FB	A	07/01/11	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 3

NR = not reported

Bold Type indicates sample taken as a Batch QC sample*Italic type* indicates samples are collocated field duplicates

All samples were received on the same day as collection. Samples were received on ice at recorded temperature of 1.5°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 124) did not indicate the presence of a custody seal on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C

Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Soil samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The recovery of Cr⁺⁶ in the Post-Spike of batch QC sample M018_N_070111 (460-28340-1) exceeded the upper limit of 115%, at 117%; re-analysis of the re-spiked sample recovered within limits at 114%.

The recovery of Cr⁺⁶ in the soluble matrix pike of batch QC sample M018_N_070111 (460-28340-1) exceeded the upper limit of 125%, at 132%; this may be due to the native sample concentration being $> 4x$ the spike added. The sample was re-digested and re-spiked at appropriate concentration; re-analysis of the re-spiked sample recovered within limits at 93%. No data qualifiers were necessary. Since the re-digested, re-analyzed results are associated with compliant QC batch results, the reviewer suggests use of these re-analysis results.

SECTION D

pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION E
COLLOCATED SAMPLES

REP070111-1 was identified as being collocated with 108_M018_N_070111. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP070111	M018_N_070111	%RPD
Cr (VI)	256	306	17.8

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

01 February, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-29983-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Site 107

Fractions

Hexavalent chromium (Cr^{+6})
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-29983-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr^{+6}) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively. It is noted that the phase diagram plots for several SDG samples were not found in the deliverables; these were requested from the laboratory and received on 01/30/12.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 107_	Laboratory ID: 460-29983-	Matrix	Date Collected	Analysis Hex. Cr
F041E_5.0	4	S	08/15/11	X
F041E_5.5	5	S	08/15/11	X
F041E_6.0	6	S	08/15/11	X
F039W_4.5	7	S	08/15/11	X
F039W_5.0	8	S	08/15/11	X
F039W_6.0	9	S	08/15/11	X
F039W_6.5	10	S	08/15/11	X
F039W_7.5	11	S	08/15/11	X
F039W_8.5	12	S	08/15/11	X
F039W_9.0	13	S	08/15/11	X
F039W_10.0	14	S	08/15/11	X
F038_4.5	15	S	08/15/11	X
<i>F038_5.0</i>	16	S	08/15/11	X
F038_6.0	17	S	08/15/11	X
<i>F038_6.5</i>	18	S	08/15/11	X
F038_7.5	19	S	08/15/11	X
F038_9.0	20	S	08/15/11	X
F038_8.5	21	S	08/15/11	X
F038_10.0	22	S	08/15/11	X
F037E_4.5	23	S	08/15/11	X
F037E_6.0	24	S	08/15/11	X
F037E_5.0	25	S	08/15/11	X
F037E_6.5	26	S	08/15/11	X
F037E_7.5	27	S	08/15/11	X
F037E_8.5	28	S	08/15/11	X
<i>REP081511-1</i>	31	S	08/15/11	X
<i>REP081511-2</i>	32	S	08/15/11	X
FB081511	33FB	A	08/15/11	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 28

NR = not reported

Bold Type indicates sample taken as a Batch QC sample

Italic type indicates samples are collocated field duplicates

All samples were received one day following collection. Samples were received on ice at recorded temperature of 2.7°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 330) did not indicate the presence of a custody seal on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C
Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Some samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

Soil samples in this SDG were extracted and analyzed in three separate QC batches; sample F039W_8.5 (Lab ID: 460-29983-12) and eight associated samples (460-29983-4-6, 8-11 and 31) were included in the SDG sample QC batch. Although the remainder of the SDG soils associated QC batch results were reported within acceptable limits, the parent QC batch samples were not from this site and may not be representative of this SDG's / site's matrix characteristics. No data validation qualifiers were assigned.

SECTION D
pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr⁺⁶ sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION E
COLLOCATED SAMPLES

REP081511-1 and REP081511-1 were identified as being collocated with F038_5.0 and F038_6.5, respectively. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample $< 5x$ CRQL.

	REP081511-1	F038_5.0	%RPD	REP081511-2	F038_6.5	%RPD
Cr (VI)	16.9	22.1	27	3.0	2.8	0.2*

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action is necessary based on the above field duplicate precision results.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

01 February, 2012 *Revised 01 March, 2013*

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: PPG – Site 107, Laboratory Job No. 460-30033-1

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: PPG – Sites 107 & 108

Fractions

Hexavalent chromium (Cr⁺⁶)
pH / Eh ; ORP

Laboratory: TestAmerica Laboratories, Inc.

Report No.: 460-30033-1

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by TestAmerica Laboratories, Inc., Edison, NJ (NJ Laboratory ID Cert. No. 12028). Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples (if requested) were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6010B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively. It is noted that the phase diagram plots for several SDG samples were not found in the deliverables; these were requested from the laboratory and received on 01/30/12.

A summary table of samples analyzed is presented below. Please note that the number of ‘Total Samples’ listed below is exclusive of associated QC samples (MS / MD).

Sample ID: 107	Laboratory ID: 460-30033-	Matrix	Date Collected	Analysis Hex. Cr
F036E_3.5	2	S	08/16/11	X
F037_4.5	4	S	08/16/11	X
F037_5.0	5	S	08/16/11	X
F037_5.5	6	S	08/16/11	X
F035_3.0	7	S	08/16/11	X
F035_3.5	8	S	08/16/11	X
F035_4.0	9	S	08/16/11	X
G037N_4.5	10	S	08/16/11	X
G037N_5.0	11	S	08/16/11	X
G037N_5.5	12	S	08/16/11	X
G037S_5.0	14	S	08/16/11	X
H037_5.0	17	S	08/16/11	X
H037_5.5	18	S	08/16/11	X
F036S_3.0	19	S	08/16/11	X
F036S_3.5	20	S	08/16/11	X
F036S_4.0	21	S	08/16/11	X
E036_3.0	22	S	08/16/11	X
E036_3.5	23	S	08/16/11	X
E036_4.0	24	S	08/16/11	X
F036W_3.0	25	S	08/16/11	X
F036W_3.5	26	S	08/16/11	X
F036W_4.0	27	S	08/16/11	X
Sample ID: 108	Laboratory ID: 460-30033-	Matrix	Date Collected	Analysis Hex. Cr
M018_A_1.0	28	S	08/16/11	X
M018_A_0.0	29	S	08/16/11	X
M018_A_2.0	30	S	08/16/11	X
M018_A_2.5	31	S	08/16/11	X
M018_A_3.0	32	S	08/16/11	X
M018_A_3.5	33	S	08/16/11	X
M018_A_4.0	34	S	08/16/11	X
M018_A_4.5	35	S	08/16/11	X
M018_B_0.0	38	S	08/16/11	X
M018_B_1.0	39	S	08/16/11	X
M018_B_2.0	40	S	08/16/11	X
M018_B_2.5	41	S	08/16/11	X
M018_B_3.0	42	S	08/16/11	X
M018_B_3.5	43	S	08/16/11	X
M018_B_4.5	44	S	08/16/11	X
M018_C_0.0	48	S	08/16/11	X
M018_C_1.0	49	S	08/16/11	X
M018_C_2.0	50	S	08/16/11	X
M018_C_2.5	51	S	08/16/11	X
REP081611-1	58	S	08/16/11	X
REP081611-2	59	S	08/16/11	X
REP081611-3	60	S	08/16/11	X
FB081611	62FB	A	08/16/11	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 45

NR = not reported

Bold Type indicates sample taken as a Batch QC sample*Italic type* indicates samples are collocated field duplicates

All samples were received one day following collection. Samples were received on ice at recorded temperatures of 2.4 and 3.1°C. The chain-of-custody indicated appropriate chemical preservation. The sample receipt log (p. 502) did not indicate the presence of a custody seal on the sample cooler. No action was taken; however, the data users should incorporate this information into their overall assessment of data utility.

SECTION C

Hexavalent Chromium (Cr⁺⁶)

Holding times from sample collection to analysis (≤ 30 days for non-aqueous matrix; < 24 hours for aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Some samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

Soil samples in this SDG were extracted and analyzed in four separate QC batches; samples 107_H037_5.0 (Lab ID: 460-30033-17) and 108_M018_A_4.0 (Lab ID: 460-30033-34) and associated samples were included in the SDG samples QC batches. The soluble matrix spike recoveries for 107_H037_5.0 were below 50% in both the initial and redigested analyses (42%; 38%); the insoluble and post-spike recoveries were within limits.

- QA Action: Reported Cr⁺⁶ results in soil samples 30033-(4-10), 12, (17-19) and 21 are flagged estimated, "UJ" or 'J', with indication of low bias due to sample matrix effects.

Although the remainder of the SDG soils associated QC batch results were reported within acceptable limits, the parent QC batch samples were not from this site and may not be representative of this SDG's / site's matrix characteristics. No other data validation qualifiers for Cr⁺⁶ were necessary.

SECTION D

pH / Eh (ORP)

Samples for pH analysis were analyzed outside the method-defined holding-time of 15 minutes, which is essentially a 'field-performed' analysis. The laboratory assigned all reported pH results an 'HF' qualifier flag to indicate this exception. No data validation qualifiers were assigned.

Calibrations for pH analysis were acceptable, as were required QC criteria (sample duplicates). Standard mV solution checks for Eh (Light's solution) were within acceptable ranges, as were sample duplicate measurements.

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; no disparities relative to reported values and characteristics were found. These values are only used for data assessment purposes when Cr^{+6} sample matrix spike recoveries are outside acceptable recovery ranges.

SECTION E
COLLOCATED SAMPLES

REP081611-1, -2 and -3 were identified as being collocated with 107_G037N_5.0, 107_E036_3.5 and 108_M018A_2.5, respectively. Precision results are tabulated below. Note: ND = Not Detected ; nc = not calculated ; * = absolute difference is shown if either sample <5x CRQL.

	REP-1	G037N_5.0	%RPD	REP-2	E036_3.5	%RPD	REP-3	M018A_2.5	%RPD
Cr (VI)	40.9	40.4	1.2	35.9	39.5	9.5	9.1	9140	##

The disparity between Rep-3 and parent results indicates possible sample mis-identification. No action was taken based on these disparate results.

The NJDEP DV guidance protocols do not provide qualification thresholds for field duplicate precision values; however, EPA Region II data validation guidance (SOP No. HW-2, Rev. 13, Sept. 2006) provides for a qualification range of >35%, <120% RPD for soils >5x CRQL values, and difference >2x CRQL if either sample is <5x CRQL. No QA action was taken based on the above field duplicate precision results.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

11 December, 2012

Dresdner-Robin Environmental Management
Att: Mr. Douglas Neumann, Director
371 Warren Street
Jersey City, New Jersey 07302

Re: CONRAIL - PPG Site , Laboratory Case No. E12-06877

Dear Mr. Neumann,

This cover letter, and the attached documents, detail the data validation findings associated with the following sample analytical results contained in the above-referenced deliverables set:

Site Name: CONRAIL - PPG Site

Fractions

Hexavalent chromium (Cr⁺⁶)
Total Metals (Sb & V only)
pH / Eh ; ORP

Laboratory: Integrated Analytical Laboratories, LLC

Report No.: E12-06877

Matrix: Non-Aqueous

Reviewer: Chris Taylor

Prepared By: Environmental Quality Associates, Inc.

SECTION A
Sample Information

The above-noted laboratory Job Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), NJ Laboratory ID Cert. No. 14751. Hexavalent chromium (Cr⁺⁶) samples were prepared and analyzed using USEPA SW-846 methods 3060A and 7196A. Total metals samples were prepared and analyzed using USEPA SW-846 methods 3050B (3010A for aqueous samples) and 6020B. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the HCrO₄⁻ / Cr(OH)₃ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

A summary table of samples analyzed is presented below. Please note that the number of 'Total Samples' listed below is exclusive of associated QC samples (MS / MD).

Sample ID	Lab ID	Matrix	Date Collected	Analysis	
				Hex. Cr	Metals
108_M016W_1_1-1.5	06877-001	S	07/10/12	X	X
108_M016W_1_1.5-2.0	06877-002	S	07/10/12	X	X
108_M016W_1_2.0-2.5	06877-003	S	07/10/12	X	X
108_M016_1_1.0-1.5	06877-008	S	07/10/12	X	X
108_M016_1_1.5-2.0	06877-009	S	07/10/12	X	X
108_M016_1_2.0-2.5	06877-010	S	07/10/12	X	X
108_M018W2_1_1.0-1.5	06877-015	S	07/10/12	X	X
108_M018W2_1_1.5-2.0	06877-016	S	07/10/12	X	X
108_M018W2_1_2.0-2.5	06877-017	S	07/10/12	X	X
108_M018W2_1_3.0-3.5	06877-018	S	07/10/12	X	
108_M018W2_1_4.0-4.5	06877-019	S	07/10/12	X	
REP071012-1	06877-022	S	07/10/12	X	X
108_M018N_1_1.0-1.5	06877-023	S	07/10/12	X	X
108_M018N_1_1.5-2.0	06877-024	S	07/10/12	X	X
108_M018N_1_2.0-2.5	06877-025	S	07/10/12	X	X
108_M018N_1_3.0-3.5	06877-026	S	07/10/12	X	X
108_M018N_1_3.5-4.0	06877-027	S	07/10/12	X	X
107_M022_1_1.0-1.5	06877-030	S	07/10/12	X	
107_M022_1_2.0-2.5	06877-031	S	07/10/12	X	
107_M022_1_3.0-3.5	06877-032	S	07/10/12	X	
107_M022_1_4.0-4.5	06877-033	S	07/10/12	X	
107_M024_1_0.5-1.0	06877-036	S	07/10/12	X	
107_M024_1_1.0-1.5	06877-037	S	07/10/12	X	
107_M024_1_2.0-2.5	06877-038	S	07/10/12	X	
107_M024_1_3.0-3.5	06877-039	S	07/10/12	X	
107_M024_1_4.0-4.5	06877-040	S	07/10/12	X	
107_M018E2_N_1.0-1.5	06877-044	S	07/10/12	X	X
107_M018E2_N_1.5-2.0	06877-045	S	07/10/12	X	X
107_M018E2_N_2.0-2.5	06877-046	S	07/10/12	X	X
107_M018E2_N_3.0-3.5	06877-047	S	07/10/12	X	X
107_M018E2_N_3.5-4.0	06877-048	S	07/10/12	X	X
107_M018E2_N_5.5-6.0	06877-049	S	07/10/12	X	X
107_M020N_1_1.0-1.5	06877-050	S	07/10/12	X	X
107_M020N_1_2.0-2.5	06877-051	S	07/10/12	X	X
107_M020N_1_3.0-3.5	06877-052	S	07/10/12	X	X
107_M020N_1_4.0-4.5	06877-053	S	07/10/12	X	X
107_M020N_1_5.0-5.5	06877-054	S	07/10/12	X	X
107_M022N_1_1.0-1.5	06877-057	S	07/10/12	X	
107_M022N_1_2.0-2.5	06877-058	S	07/10/12	X	
107_M022N_1_3.0-3.5	06877-059	S	07/10/12	X	
107_M022N_1_4.0-4.5	06877-060	S	07/10/12	X	
_1_1.0-1.5_1_1.0-1.5	06877-065	S	07/10/12	X	
_1_2.0-2.5_1_2.0-2.5	06877-066	S	07/10/12	X	
_1_3.0-3.5_1_3.0-3.5	06877-067	S	07/10/12	X	
_1_4.0-4.5_1_4.0-4.5	06877-068	S	07/10/12	X	
REP07 102	06877-071	S	07/10/12	X	
FB071012	06877-072	A	07/10/12	X	X

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 47 (Cr+6) ; 26 (V) ; 3 (Sb)

Bold Type indicates sample taken as a Batch QC sample

Italic type indicates samples are collocated field duplicates

All samples were received one day from collection. Samples were received on ice at recorded temperature of 4°C. No sample condition issues were noted in the sample receipt log.

SECTION B
Hexavalent Chromium

Holding times from sample collection to analysis (≤ 24 hours for aqueous matrix; ≤ 30 days for non-aqueous matrix) were met for all samples.

All calibration criteria were met for this sample group, including: initial calibration linearity and continuing calibration frequency and accuracy. Method and calibration blanks for soils were free of contamination. Reported matrix spike recoveries, duplicate precision values, reported % moisture (% solids) and reported Cr⁺⁶ results were randomly verified from the raw data with no disparities between reported and calculated results found. Several samples were analyzed at dilution volumes due to Cr⁺⁶ concentrations above calibrated range; reported RL values were adjusted accordingly for these dilution runs and are noted on the sample result forms.

The soluble spike recoveries of Cr⁺⁶ in batch QC sample E12-06877-068 were below the lower limit of 75%, on initial and re-analysis. Since insoluble recoveries were $>50\%$, the reported results for associated samples (-068, -071) were qualified as estimated 'J' for Cr⁺⁶. The parent sample was subsequently analyzed for ORP, sulfide (S⁻), TOC and ferrous iron (Fe⁺⁺). TOC result was positive (22400 mg/Kg), S⁻ was non-detect and Fe⁺⁺ was below RL value. Based on these ancillary results, it is indicated that the soil matrix is of a reductive nature that would not support the presence of hexavalent chromium.

SECTION C
Total Metals (V, Sb)

Holding times from sample collection to analysis were met for all total metals samples.

Calibration and QC criteria were met for this sample group, including: initial calibration linearity, continuing calibration frequency and accuracy, blanks, interference checks, matrix spike recoveries, duplicate precision, LCS recoveries and serial dilution sample precision. Reported % moisture (% solids) and reported metal results were randomly verified from the raw data with no disparities between reported and calculated results found.

No positive element results were reported for the field blank sample (FB071012).

SECTION D
ReDox Characteristics

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the HCrO₄⁻ / Cr(OH)₃ phase diagram; no disparities relative to reported values and characteristics were found.

SECTION E
COLLOCATED SAMPLES

The identity of the sample collocated with sample REP071012-4 was not found in the summary table.

SECTION F
Overall Recommendations

The results of the review and validation process for the above analytical fractions and associated samples are summarized on the attached standard-format NJDEP Data Validation Report Forms, in order to facilitate the end-user's' review of these data.

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB51380
Sample Date: October 28, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: January 31, 2014

This data validation (DV) report presents the data review and result qualifications for eight (8) soil samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on October 28, 2013 for sample delivery group (SDG) JB51380. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB51380 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the eight collected soil samples.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB512380-1 through -8 (inclusive);
- Chromium (ENJ-) in Samples JB512380-1 through -8 (inclusive);
- Nickel (ENJ-) in Samples JB512380-1 through -8 (inclusive);
- Vanadium (ENJ-) in Samples JB512380-1 through -8 (inclusive).

No other sample results in SDG JB51380 required qualification, including hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. All reported concentrations were below the respective site remediation standard (SRS) limits.

The sample results that were subject to qualification following the DV review are presented in Table 4 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The eight (8) soil samples collected October 28, 2013, were received on the same day at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 1°C. The

samples destined for metals analysis were received at the Accutest Laboratories Southeast, Inc. in Orlando, Florida October 30, 2013 preserved and in good condition with sampling cooler temperatures of 3°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
HD002 5-5.5	JB51380-1	10/28/13	Soil	Metals, Cr+6
HD002 5.5-6	JB51380-2	10/28/13	Soil	Metals, Cr+6
HD002 6-6.5	JB51380-3	10/28/13	Soil	Metals, Cr+6
HD002 6.5-7	JB51380-4	10/28/13	Soil	Metals, Cr+6
HD003 4-4.5	JB51380-5	10/28/13	Soil	Metals, Cr+6
HD003 4.5-5	JB51380-6	10/28/13	Soil	Metals, Cr+6
HD003 5-5.5	JB51380-7	10/28/13	Soil	Metals, Cr+6
HD003 5.5-6	JB51380-8	10/28/13	Soil	Metals, Cr+6

Metals – Antimony, total chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando, FL.
 Cr+6 – Hexavalent chromium (Cr+6) analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ., together with redox potential and pH.

Data Review

Data, as presented in the analytical data package SDG JB51380, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006);
- *NJDEP Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Sample results exhibited concentrations below the respective site remediation standard (SRS) levels in each of the 8 soil samples of this SDG, except nickel (34.1 mg/Kg) in HD002 5-5.5 (JB51380-1).

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony, chromium, nickel and vanadium were identified as being outside QC limits in QC Batch MP26309 indicating possible matrix interference and/or sample non-homogeneity. The case narrative also stated that the RPD(s) for Duplicate for chromium, vanadium, nickel; and RPD(s) for MSD for antimony and thallium are outside control limits due to possible sample non-homogeneity. The RPDs of the serial dilution results for chromium, nickel and vanadium are outside QC limits in QC Batch MP26309 with the probable cause due to sample non-homogeneity. All other QC requirements were met, including analyses for Cr⁺⁶, pH, oxidation reduction potential, and total solids. Details are discussed in the sections below.

However, inspection of the data revealed that the RPD values for the duplicate analysis (chromium, nickel, and vanadium) and the thallium in the duplicate spike analysis were actually below the DV guidelines of 35%RPD, as explained in text below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There was one exception where the 66% antimony recovery in a closing "CRI" recovered below the 70-130% QC limits. However, no soil sample results were affected by this standard because all reporting limits of the non-detect antimony results were above the affected range (True spike value ± CRQL) and thus, no soil sample results were subject to qualification for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks or the continuing calibration blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB51380.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony, chromium, and vanadium were below QC limits of 75 - 125% for QC samples in the non-client QC sample in QC Batch MP26309, as well as the MS recovery for nickel in the MSD sample, which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). Since there is no minimum spike recovery value for qualifying associated samples, including negative recoveries, the sample results are merely qualified as estimated values and were not rejected. Because detected concentrations of chromium and vanadium were recovered in each of the eight soil samples of this SDG, qualification, and not rejection, of the chromium and vanadium result was judged appropriate and acknowledged by Mr. Joseph Sanguiliano of the NJDEP. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26309 †	FA9475-1	Antimony	17.6 %	8.3 %	NJ-	Low
MP26309 †	FA9475-1	Chromium	-1.8 %	-19.7 %	NJ-	Low
MP26309 †	FA9475-1	Nickel	76.8 %	72.2 %	NJ-	Low
MP26309 †	FA9475-1	Vanadium	-5.1 %	-9.7 %	NJ-	Low
QC Limits are 75-125%; NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike MSD – Matrix spike duplicate. † – The samples associated with QC Batch MP26309 consist of JB51380-1 through -8 (inclusive).						

The antimony, chromium, nickel, and vanadium results in all of these affected samples are flagged with "NJ-" due to a potential low bias. These qualified results are presented below in summary table, Table 4, together with the results qualified for serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on the batch QC sample, as well as a spiked duplicate sample, both from another client with concentrations comparable to PPG samples. All %RPD values were below the DV guidance QC limit of 35%RPD (USEPA, 2010), with values ranging 0-33.9%RPD for soil samples, except for the antimony result in the spiked duplicate sample (non-client sample FA9475-1). Although the difference between the spiked duplicates was 90.9%RPD,

due to the low sample concentration, the QC limit applicable for assessing the precision was 2 × CRQL (2 × 1 mg/Kg), which was exceeded by the difference between the spiked duplicate results of 1.8 and 4.8 mg/Kg. However, because the spike amounts applied to the samples differed by almost twice that amount (5.6 mg/Kg), it was judged appropriate to not qualify the associated results because the values were not comparable. The greater amount recovered in the MSD is likely more attributable to the larger spike, rather than problems in the precision. Consequently, it was judged appropriate to not qualify the associated sample results because the conditions of the spike differed more than the recovered amounts.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 93.1% - 103.0% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the RPD serial dilution results being outside QC limits for chromium, nickel, and vanadium in QC Batch MP26309 and stated that the probable cause for the difference is due to sample non-homogeneity, though the likely cause is attributable to interferences within the sample matrix. Thus, the affected chromium, nickel, and vanadium results in the samples associated with these elevated %D excursions are subject to qualification following the DV review, as discussed below. These QC results are detailed in Table 3 below.

Table 3. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26309 †	FA9475-1	Chromium	15.9 %D	EJ
MP26309 †	FA9475-1	Nickel	13.8 %D	EJ
MP26309 †	FA9475-1	Vanadium	16.1 %D	EJ
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.				
† – The samples associated with this QC Batch consist of JB51380-1 through -8 (inclusive).				

The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB51380-1 through -8, inclusive, are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 4, along with the results qualified for matrix spike recoveries outside QC limits.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported nickel results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)

V = final volume (mL)
 DF = Dilution factor
 W = wet weight (g)
 TS = Total solids (%)
 1000 = conversion factor (mL/L)

The nickel concentration for Sample HD002 5-5.5 (JB51380-1) was listed as 34.1 mg/Kg on the reporting form and 0.6847 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Nickel (mg/Kg)} = \frac{(684.7 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.09 \text{ g}) (92.1/100\%)} = \frac{34,235}{1003.89} = 34.1023 \mu\text{g/g}$$

$$= 34.1 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 19.5 mg/Kg for Sample HD002 5-5.5 was correctly reported.

Reporting Limits

No samples required dilution, such that all reporting limits were below the respective SRS values.

Summary

The soil sample analytical results for the samples of SDG JB51380 were found to be compliant with the analytical methods for the analysis of metals in the thirty-six soil samples using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries for antimony, chromium, nickel, and vanadium in the QC batch associated with the eight soil samples: JB451380-1 through -8. The antimony, chromium, nickel and vanadium results in these samples are qualified as estimated values (flagged "NJ-") in the associated soil samples due to a potential low bias, as summarized below in Table 4.

The serial dilution results for chromium, nickel, and vanadium in the QC sample of QC Batch MP26309 were above the QC limit of 10.0 %D, suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the identified results are qualified as estimated values and are flagged with "EJ" in the eight samples, as presented below in Table 4.

Table 4. Summary Qualified Sample Metals Results in SDG JB51380

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
HD002 5-5.5	JB51380-1	Antimony	< 2.0	NJ-
HD002 5-5.5	JB51380-1	Chromium	20.0	ENJ-
HD002 5-5.5	JB51380-1	Nickel	34.1	ENJ-
HD002 5-5.5	JB51380-1	Vanadium	13.3	ENJ-
HD002 5.5-6	JB51380-2	Antimony	< 1.5	NJ-
HD002 5.5-6	JB51380-2	Chromium	10.0	ENJ-
HD002 5.5-6	JB51380-2	Nickel	20.6	ENJ-
HD002 5.5-6	JB51380-2	Vanadium	9.4	ENJ-
HD002 6-6.5	JB51380-3	Antimony	< 1.8	NJ-
HD002 6-6.5	JB51380-3	Chromium	12.1	ENJ-
HD002 6-6.5	JB51380-3	Nickel	29.7	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
HD002 6-6.5	JB51380-3	Vanadium	13.2	ENJ-
HD002 6.5-7	JB51380-4	Antimony	< 1.7	NJ-
HD002 6.5-7	JB51380-4	Chromium	10.3	ENJ-
HD002 6.5-7	JB51380-4	Nickel	24.9	ENJ-
HD002 6.5-7	JB51380-4	Vanadium	11.5	ENJ-
HD003 4-4.5	JB51380-5	Antimony	< 2.1	NJ-
HD003 4-4.5	JB51380-5	Chromium	12.0	ENJ-
HD003 4-4.5	JB51380-5	Nickel	10.8	ENJ-
HD003 4-4.5	JB51380-5	Vanadium	16.4	ENJ-
HD003 4.5-5	JB51380-6	Antimony	< 2.2	NJ-
HD003 4.5-5	JB51380-6	Chromium	13.3	ENJ-
HD003 4.5-5	JB51380-6	Nickel	12.4	ENJ-
HD003 4.5-5	JB51380-6	Vanadium	17.2	ENJ-
HD003 5-5.5	JB51380-7	Antimony	< 1.5	NJ-
HD003 5-5.5	JB51380-7	Chromium	16.9	ENJ-
HD003 5-5.5	JB51380-7	Nickel	18.2	ENJ-
HD003 5-5.5	JB51380-7	Vanadium	20.8	ENJ-
HD003 5.5-6	JB51380-8	Antimony	< 5.9	NJ-
HD003 5.5-6	JB51380-8	Chromium	26.6	ENJ-
HD003 5.5-6	JB51380-8	Nickel	17.5	ENJ-
HD003 5.5-6	JB51380-8	Vanadium	28.8	ENJ-

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J- – The result is an estimated value, but the result may be biased low.
- EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the eight (8) soil samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ Quantitation checks | √ Data qualifiers |
| √ Data package completeness | |

Hexavalent chromium was detected in five of eight soil samples analyzed in SDG JB51380 with detected concentrations of 1.4 or less, such that no Cr+6 results had exceeded the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with a value of 0.99992, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 95.7% to 96.4% for the QC batch associated with the 8 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 5. No hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 5. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75644	JB51380-1	Cr ⁺⁶ , soluble	78.2 %	----	----
GP75644	JB51380-1	Cr ⁺⁶ , insoluble	85.0 %	----	----
GP75644	JB51380-1	Cr ⁺⁶ , post spike	99.2 %	----	----
QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery MS – Matrix spike Cr ⁺⁶ – Hexavalent chromium					

Duplicate Sample Analysis

All %RPD values observed in the general chemistry set of duplicate analyses were less than the laboratory QC limit of 20%RPD, as well as below the 35%RPD project QC limit for soil samples (USEPA, 2010; AECOM, 2010). The 13.3%RPD result for the duplicate Cr⁺⁶ analysis demonstrated acceptable analytical precision, as did the 14.4%RPD result for redox potential and 1.0%RPD for the pH analysis. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries of 99.0 and 100.4%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed since it is not required by the analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calibration curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100%
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample HD002 5-5.5 (JB51380-1) was listed as 1.4 mg/Kg on the reporting form and 0.0317 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.0317 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00243 \text{ Kg} \times 92.1/100} = \frac{0.00317}{0.002238} = 1.416 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 1.4 \text{ mg/Kg}$$

After rounding to two significant figures, this verifies that the hexavalent chromium concentration of 1.4 mg/Kg for Sample HD002 5-5.5 was correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 8 soil samples of this SDG, JB51380. Thus, all detected Cr⁺⁶ concentration results were below the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

With the exception of Sample JB51380-7 (< 0.45 mg/Kg Cr+6), which fell on the Eh-pH phase diagram line, all samples fell clearly below the Eh-pH phase diagram line depicting a reducing soil environment. The reported Cr+6 results are considered acceptable because the Cr+6 concentrations are less than 1.4 mg/Kg under a reducing environment, and are not expected to experience higher Cr+6 concentrations, since the highest observed total chromium result in any of these samples was only 26.6 mg/Kg (the corresponding Cr+6 concentration in this sample is 0.89 mg/Kg). Thus, the hexavalent chromium results are considered acceptable, as reported, with all hexavalent chromium concentrations less than 1.5 mg/Kg and thereby also below the SRS of 20 mg/Kg, as detailed in the text above.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were within QC limits, as were all other QC results associated with the hexavalent chromium analysis, including the duplicate sample analysis, no Cr⁺⁶ results were qualified following the DV review.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

US EPA, CLP, 2010, ***“National Functional Guidelines for Inorganic Superfund Data Review”***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13***, September 2006.

US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 51380

1. Were the appropriate sample preservation requirements met?..... Yes No
2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

Samples were diluted for metals analysis due to matrix interference.
(2x) JB 51380 - 1, 2, 3, 4, 5, 6, 7.
(5x) JB 51380 - 8

4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

one nickel: JB 51380 - 1

6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.
No analytical procedural problems were noted.

JB51380

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2 and 3 for details.

Qualified sample results are presented in Table 4 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB51499
Sample Date: October 29, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: February 7, 2014

This data validation (DV) report presents the data review and result qualifications for sixteen (16) soil samples and one field blank (FB) collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on October 29, 2013 for sample delivery group (SDG) JB51499. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB51499 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 16 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony ("NJ-") in Samples JB51499-1 through -16 (inclusive);
- Chromium ("NJ-") in Samples JB51499-1 through -16 (inclusive);
- Nickel ("ENJ-") in Samples JB51499-1 through -16 (inclusive);
- Vanadium ("ENJ-") in Samples JB51499-1 through -16 (inclusive);

No other sample results in SDG JB51499 required qualification, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for seven nickel results and three hexavalent chromium results.

The sample results that were subject to qualification following the DV review are presented in Table 5 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The sixteen (16) soil samples and one field blank collected October 29, 2013, were received the same day at the Accutest laboratory in Dayton, NJ with an acceptable sampling cooler temperature of 4°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. preserved and in good condition with on October 31, 2013 with sampling cooler temperatures of 2.8°C. The field sample identification numbers and corresponding laboratory

identification numbers are as follows:

Table 1. Sample Receipt Summary – SDG JB51499

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
GD001 4-4.5	JB51499-1	10/29/2013	Soil	Metals, Cr+6
GD001 4.5-5	JB51499-2	10/29/2013	Soil	Metals, Cr+6
GD001 5-5.5	JB51499-3	10/29/2013	Soil	Metals, Cr+6
GD001 5.5-6	JB51499-4	10/29/2013	Soil	Metals, Cr+6
FD003 5-5.5	JB51499-5	10/29/2013	Soil	Metals, Cr+6
FD003 5.5-6	JB51499-6	10/29/2013	Soil	Metals, Cr+6
FD003 6-6.5	JB51499-7	10/29/2013	Soil	Metals, Cr+6
FD003 6.5-7	JB51499-8	10/29/2013	Soil	Metals, Cr+6
FD004 5-5.5	JB51499-9	10/29/2013	Soil	Metals, Cr+6
FD004 5.5-6	JB51499-10	10/29/2013	Soil	Metals, Cr+6
FD004 6-6.5	JB51499-11	10/29/2013	Soil	Metals, Cr+6
FD004 6.5-7	JB51499-12	10/29/2013	Soil	Metals, Cr+6
FD005 9.5-10	JB51499-13	10/29/2013	Soil	Metals, Cr+6
FD005 10-10.5	JB51499-14	10/29/2013	Soil	Metals, Cr+6
FD005 10.5-11	JB51499-15	10/29/2013	Soil	Metals, Cr+6
FD005 11-11.5	JB51499-16	10/29/2013	Soil	Metals, Cr+6
FB01	JB51499-17	10/29/2013	Aqueous	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast Inc, in Orlando FL.
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB51499, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) *“National Functional Guidelines for Inorganic Data Review”*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006);
- *NJDEP Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary

and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. The soil sample results exhibited concentrations below the respective site remediation standard (SRS) levels in the 16 soil samples of this SDG, except for seven nickel results.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS)/matrix spike duplicate (MSD) recoveries were outside QC limits for antimony, chromium, nickel, and vanadium in QC Batch MP26322,. However, the 78.0% MSD recovery for nickel is actually within the DV QC limits of 75-125% (NJDEP, 2002). The case narrative stated that the serial dilution results were outside QC limits for chromium, nickel, and vanadium in the soil QC batch and the percent difference values were acceptable because the low initial sample concentration ($< 50 \times \text{IDL}$). However, this statement conflicts with the actual data, where it was observed that the initial concentrations for nickel and vanadium were $> 50 \times \text{IDL}$ and, therefore, are subject to qualification.

All other QC requirements were met, including analyses for hexavalent chromium, pH, oxidation reduction potential, and total solids analysis. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard area counts identified below.

The exceptions included the internal standard (IS) area counts for IS#1 and IS#2 which are associated with antimony, and chromium and vanadium, respectively, in analytical run MA11198.

However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, the one affected sample in MA11198, JB51499-13 (119%), was not reanalyzed, as the IS area counts are considered acceptable, when based on the preceding method blank (MB) area counts. The duplicate sample analysis and the MS/MSD and post spike results were identified as having area counts above the QC requirement. However, when based on the preceding MB area counts, the area count recoveries were all under 120% and considered acceptable, hence they were not reanalyzed. Consequently, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB51499.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries were within the QC limits of 75 - 125% for QC samples in the one identified QC batch for the soil samples, except for those recoveries identified below in Table 2.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26322 Ω	JB51432-1	Antimony	28.2 %	29.0 %	NJ-	Low
MP26322 Ω	JB51432-1	Chromium	69.3 %	74.7%	NJ-	Low
MP26322 Ω	JB51432-1	Nickel	72.9 %	78.0 %	NJ-	Low
MP26322 Ω	JB51432-1	Vanadium	70.0 %	74.0 %	NJ-	Low
QC Limits are 75-125%; NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike MSD – Matrix spike duplicate. Ω – The samples associated with QC Batch MP26322 consist of JB51499-1 through -16 (inclusive).						

The MS and MSD recoveries outside QC limits in Table 2 indicate possible matrix interference and/or possible sample non-homogeneity.

The antimony, chromium, nickel, and vanadium results in all of the 16 affected soil samples are flagged with “NJ-” due to a potential low bias. These individual qualified sample results are presented below in summary table, Table 5, together with the sample results qualified for the serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on a non-client QC samples with concentrations not different from those observed in PPG soil and aqueous samples. All %RPD values were below the QC limit of 35%RPD for soil samples, as well as the 20%RPD QC limit for aqueous samples and no results required qualification. The duplicate analyses demonstrated acceptable analytical precision with all RPD values below 14.3 %RPD, regardless of matrix.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 86.9% - 96.0% for the soil sample metals analysis, and 93.5 to 104.2% for the aqueous analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative also stated that the RPDs for chromium, nickel and vanadium are outside QC limits in the QC batch associated with the soil samples, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, closer inspection revealed that the initial concentrations for nickel and vanadium were, in fact, above the criterion of 50 × IDL and, therefore, subject to qualification, as summarized below in Table 3. Thus, the affected nickel and vanadium results in the samples associated with these %D exceedances were subject to qualification following the DV review, as discussed below. These QC results are detailed in Table 3 below.

Table 3. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26322 Ω	JB51432-1	Nickel	11.8 %D	EJ
MP26322 Ω	JB51432-1	Vanadium	10.8 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26322 consist of JB51499-1 through -16 (inclusive).

The associated nickel and vanadium results in samples with laboratory sample ID numbers identified in Table 3 for the associated samples are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 5, along with the results qualified for matrix spike recoveries outside QC limits. Thus, the nickel and vanadium results for these samples are flagged with the combination of qualifiers as “ENJ-”.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)

V = final volume (mL)
 DF = Dilution factor
 W = wet weight (g)
 TS = Total solids (%)
 1000 = conversion factor (mL/L)

The nickel concentration for Sample FD005 10-10.5 (JB51499-15) was listed as 31.5 mg/Kg on the reporting form and 0.5832 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Nickel (mg/Kg)} = \frac{(583.2 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.15 \text{ g}) (80.6/100\%)} = \frac{29,160}{926.9} = 31.4597 \mu\text{g/g}$$

$$= 31.5 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the antimony concentration of 31.5 mg/Kg for Sample FD005 10-10.5 was correctly reported. This concentration marginally exceeded the nickel SRS of 31 mg/Kg.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 15 of the 16 soil samples for metals analysis that had been diluted by a factor of either two, five, or ten.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where two samples were diluted by a factor of 5x and 10x, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 4, diluted possibly due to elevated levels of chromium in the samples or sample/digestate appearance.

Table 4. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
FD005 10.5-11	JB51499-15	Antimony	< 2.2	5	< 11	6
FD005 11-11.5	JB51499-16	Antimony	< 1.2	10	< 12	6
FD005 11-11.5	JB51499-16	Thallium	< 0.58	10	< 5.8	3
Units – mg/Kg						
< - The analyte was analyzed for, but was not detected above the stated reporting limit.						

The interpretation of these non-detect soil results was not compromised by the applied dilution, because the nickel results in these two samples (31.5 mg/Kg and 33.2 mg/Kg) were above the SRS value of 31 mg/Kg and, thus, potentially subject to some sort of response action or further evaluation.

Summary

The soil sample analytical results for the samples of SDG JB51499 were found to be compliant with the analytical methods for the analysis of metals in the sixteen soil samples and one field blank using SW-846 Method 6010C.

The QC criteria were met for the metals target analyte analyses, except for the low matrix spike recoveries for antimony, chromium, nickel, and vanadium in the QC batch associated with 16 soil samples and are flagged with "NJ-" suggesting a potential low bias.

The serial dilution results for nickel and vanadium in the QC sample associated with the 16 soil samples were above the QC limit of 10.0 %D, suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the identified nickel and vanadium results are qualified as estimated values and are flagged with "ENJ-" in the 16 samples, as presented below in Table 5, because of the low MS recoveries, as well.

Table 5. Summary Qualified Sample Metals Results in SDG JB51499

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD001 4-4.5	JB51499-1	Antimony	< 2.0	NJ-
GD001 4-4.5	JB51499-1	Chromium	12.7	NJ-
GD001 4-4.5	JB51499-1	Nickel	37.0	ENJ-
GD001 4-4.5	JB51499-1	Vanadium	11.6	ENJ-
GD001 4.5-5	JB51499-2	Antimony	< 1.9	NJ-
GD001 4.5-5	JB51499-2	Chromium	12.3	NJ-
GD001 4.5-5	JB51499-2	Nickel	26.2	ENJ-
GD001 4.5-5	JB51499-2	Vanadium	12.6	ENJ-
GD001 5-5.5	JB51499-3	Antimony	< 1.9	NJ-
GD001 5-5.5	JB51499-3	Chromium	9.9	NJ-
GD001 5-5.5	JB51499-3	Nickel	22.8	ENJ-
GD001 5-5.5	JB51499-3	Vanadium	12.0	ENJ-
GD001 5.5-6	JB51499-4	Antimony	< 1.7	NJ-
GD001 5.5-6	JB51499-4	Chromium	10.8	NJ-
GD001 5.5-6	JB51499-4	Nickel	63.1	ENJ-
GD001 5.5-6	JB51499-4	Vanadium	10.2	ENJ-
FD003 5-5.5	JB51499-5	Antimony	< 2.1	NJ-
FD003 5-5.5	JB51499-5	Chromium	29.8	NJ-
FD003 5-5.5	JB51499-5	Nickel	36.3	ENJ-
FD003 5-5.5	JB51499-5	Vanadium	12.1	ENJ-
FD003 5.5-6	JB51499-6	Antimony	< 2.2	NJ-
FD003 5.5-6	JB51499-6	Chromium	30.9	NJ-
FD003 5.5-6	JB51499-6	Nickel	21.7	ENJ-
FD003 5.5-6	JB51499-6	Vanadium	10.5	ENJ-
FD003 6-6.5	JB51499-7	Antimony	< 1.6	NJ-
FD003 6-6.5	JB51499-7	Chromium	70.0	NJ-
FD003 6-6.5	JB51499-7	Nickel	25.9	ENJ-
FD003 6-6.5	JB51499-7	Vanadium	9.2	ENJ-
FD003 6.5-7	JB51499-8	Antimony	< 2.1	NJ-
FD003 6.5-7	JB51499-8	Chromium	159	NJ-
FD003 6.5-7	JB51499-8	Nickel	24.9	ENJ-
FD003 6.5-7	JB51499-8	Vanadium	11.4	ENJ-
FD004 5-5.5	JB51499-9	Antimony	< 1.6	NJ-
FD004 5-5.5	JB51499-9	Chromium	52.2	NJ-
FD004 5-5.5	JB51499-9	Nickel	13.0	ENJ-
FD004 5-5.5	JB51499-9	Vanadium	20.4	ENJ-
FD004 5.5-6	JB51499-10	Antimony	< 1.7	NJ-
FD004 5.5-6	JB51499-10	Chromium	13.9	NJ-
FD004 5.5-6	JB51499-10	Nickel	6.6	ENJ-
FD004 5.5-6	JB51499-10	Vanadium	13.5	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
FD004 6-6.5	JB51499-11	Antimony	< 4.7	NJ-
FD004 6-6.5	JB51499-11	Chromium	16.1	NJ-
FD004 6-6.5	JB51499-11	Nickel	< 9.4	ENJ-
FD004 6-6.5	JB51499-11	Vanadium	13.8	ENJ-
FD004 6.5-7	JB51499-12	Antimony	< 1.7	NJ-
FD004 6.5-7	JB51499-12	Chromium	16.9	NJ-
FD004 6.5-7	JB51499-12	Nickel	8.9	ENJ-
FD004 6.5-7	JB51499-12	Vanadium	15.4	ENJ-
FD005 9.5-10	JB51499-13	Antimony	1.9	NJ-
FD005 9.5-10	JB51499-13	Chromium	212	NJ-
FD005 9.5-10	JB51499-13	Nickel	33.1	ENJ-
FD005 9.5-10	JB51499-13	Vanadium	15.5	ENJ-
FD005 10-10.5	JB51499-14	Antimony	< 1.6	NJ-
FD005 10-10.5	JB51499-14	Chromium	219	NJ-
FD005 10-10.5	JB51499-14	Nickel	35.7	ENJ-
FD005 10-10.5	JB51499-14	Vanadium	9.9	ENJ-
FD005 10.5-11	JB51499-15	Antimony	< 11	NJ-
FD005 10.5-11	JB51499-15	Chromium	1380	NJ-
FD005 10.5-11	JB51499-15	Nickel	31.5	ENJ-
FD005 10.5-11	JB51499-15	Vanadium	19.7	ENJ-
FD005 11-11.5	JB51499-16	Antimony	< 12	NJ-
FD005 11-11.5	JB51499-16	Chromium	2560	NJ-
FD005 11-11.5	JB51499-16	Nickel	33.2	ENJ-
FD005 11-11.5	JB51499-16	Vanadium	33.6	ENJ-

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples and one batch for the field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in 13 of the 16 soil samples, with three of the reported Cr+6 results above the SRS of 20 mg/Kg. No Cr+6 results required qualification in this SDG, JB51499.

Case Narrative

The case narrative indicated that all QC requirements were met, and that good recoveries were achieved for the matrix spike analyses.

Calibrations

The initial calibrations for the various Cr+6 analyses demonstrated acceptable correlation coefficients with values of at least 0.99973, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered between 92.2% and 92.5% for soil analyses and 97.6 to 97.9% for the FB analysis, thereby meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in the method blanks (< 0.40 mg/Kg), continuing calibration blanks or field blank (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The soluble and insoluble matrix spike recoveries for hexavalent chromium, as well as the post-digestion spikes, were below the respective QC limits for both soil QC batches, as well as the aqueous sample batch, thereby demonstrating acceptable accuracy and no hexavalent chromium results were qualified following the DV review. The spike recoveries ranged 96.7% to 103.5%, well within QC limits.

Duplicate Sample Analysis

All duplicate analyses met QC requirements with values less than 5.7 %RPD, including redox potential and pH analyses, except for the 22.7 %RPD value for Cr+6 analysis in QC Batch GP75698, a value still below the suggested 35%RPD QC limit for soil analysis (USEPA, 2010). Consequently, no sample results associated with this SDG, SDG JB51499, are subject to qualification for analytical precision issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 88.5% to 100.0%, thereby demonstrating acceptable analytical system performance for both the soil and aqueous analyses.

Sample Result Verification

The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where:

- A = conc. from calib. curve (mg/L)
- B = Final digested volume (L)
- C = Wet wt of sample (Kg)
- D = % Solids/100
- E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample FD005 10-10.5 (JB51499-15) was listed as 30.3 mg/Kg on the reporting form and 0.6103 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.6103 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.0025 \text{ Kg} \times 80.6\%/100\%} = \frac{0.06103}{0.002015} = 30.2878 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 30.3 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 30.3 mg/Kg for Sample FD005 10-10.5 was correctly reported. This was the highest detected Cr+6 concentration detected among the sixteen soil samples of this SDG, JB51499. There were three Cr+6 results above the SRS of 20 mg/Kg in this SDG.

pH/Eh (ORP)

The pH and Eh (ORP) data were reviewed and determined to have acceptable QC results and are correctly reported on the sample "Report of Analysis" forms, which essentially serve as the "Form I" for reporting results.

The pH and Eh results were compared to the Eh-pH phase diagrams and verified that the sample points are correctly located on the diagrams. All sample results were observed to fall under the Eh-pH phase diagram line, thereby demonstrating "reducing" conditions, with the possible exception of JB51499-8 which may be marginally above the Eh-pH line and whose Cr+6 concentration was only 11.5 mg/Kg. Hexavalent chromium was detected in 13 of the 16 soil samples of JB51499 at concentrations of 15.9 mg/Kg or less, except for the elevated Cr+6 results in samples JB51499-13, -15, and -16 which were above the SRS of 20 mg/Kg.

Summary of Hexavalent Chromium Results in SDG JB51499

The soil sample analytical results for the samples of SDG JB51499 met all QC requirements of the hexavalent chromium analyses, such that no sample Cr+6 results required qualification.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

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New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

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US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 51499

1. Were the appropriate sample preservation requirements met?..... Yes No
2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

Matrix interference for metals analysis.
(2x) JB 51499 - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14.
(5x) JB 51499 - 11, 15
(10x) JB 51499 - 16

4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

*Antimony in JB 51499 - 15, 16.
Thallium in JB 51499 - 16*

5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

*Seven nickel : JB 51499 - 1, 4, 5, 13, 14, 15, 16.
Three Cr⁺⁶ : JB 51499 - 13, 15, 16.*

6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

*Refer to DV report discussions of case narrative regarding QC limit exceedances.
No analytical procedural problems were noted.*

JTB 51499

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report tables 2 and 3 for details.

Qualified sample results are presented in Table 5 of the DV report.



DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB51636
Sample Date: October 29 & 30, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
SPLP Leachate, EPA Methods 1312, 6010C
Percent Solids, SM2540 G-97
Reviewer: J. Giga. Ph.D., REP5554
Report Date: December 17, 2013

This data validation (DV) report presents the data review and result qualifications for fifteen (15) soil samples collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on October 29 and 30, 2013 for sample delivery group (SDG) JB51636. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB51636 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 15 collected soil samples.

Following the detailed DV review, the following sample results were qualified:

- Antimony (*NJ-) in Samples JB51636-1 through -9 (inclusive), and JB51636-13 through -16 (inclusive);
- Chromium (ENJ-) in Samples JB51636-1 through -9 (inclusive), and JB51636-13 through -16 (inclusive);
- Nickel (*EJ) in Samples JB51636-1 through -9 (inclusive), JB51636-11, and JB51636-13 through -16 (inclusive);
- Vanadium (ENJ-) in Samples JB51636-1 through -9 (inclusive), and JB51636-13 through -16 (inclusive).

No other sample results in SDG JB51636 required qualification, including hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below.

Quality control (QC) criteria were met for each of the ICP target analyte analyses, except for the low matrix spike (MS) recoveries for antimony, chromium, and vanadium in the MS and MS duplicate (MSD) samples recovered below the QC limits of 75-125% for the QC sample in QC Batch MP26264. The duplicate analysis was outside QC limits for antimony and nickel, such that the associated sample results are qualified as estimated values and flagged with "*J" due to a potential variability in the analytical precision. The serial dilution analysis results for chromium, nickel and vanadium were above the QC limit of 10%D such that the chromium, nickel and vanadium results in the associated samples are qualified as estimated values and flagged with "EJ" due to the possible presence of an interference. Since the antimony, chromium, and vanadium spike recoveries were below control limits in the QC batch samples, the results in the associated samples of SDG JB51636 are qualified as estimated values and flagged with "NJ-" due

to a possible low bias in the ability to recover these three analytes in the sample matrix. Consequently, the antimony, chromium, nickel and vanadium results in 14 soil samples are qualified as estimated values and flagged with the qualifier flags “*NJ-”, “ENJ-”, “*EJ”, and “ENJ-”, respectively, and “*EJ” for nickel in JB51636-11, to indicate that the sample results are estimated values for various QC issues.

The site remediation standard (SRS) of 31 mg/Kg for nickel was either met or exceeded in six soil samples of this SDG.

The hexavalent chromium analyses were performed at the Dayton, NJ laboratory and no sample results required qualification, as all QC requirements were met. Hexavalent chromium was detected in nine of the fourteen soil samples, with four concentrations exceeding the SRS of 20 mg/Kg.

The sample results that were subject to qualification following the DV review are presented in Table 5 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The fifteen (15) soil samples collected October 29 & 30, 2013, were received at the Accutest laboratory October 30, 2103 with acceptable sampling cooler temperatures of 2.1°C. The samples destined for metals analysis were received at the Accutest Laboratories Southeast, Inc. in Orlando, Florida November 2, 2013 preserved and in good condition with sampling cooler temperatures of 3.4°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
HD001 0"-6"	JB51636-1	10/30/13	Soil	Metals, Cr+6
HD001 2-2.5	JB51636-2	10/30/13	Soil	Metals, Cr+6
HD001 4-4.5	JB51636-3	10/30/13	Soil	Metals, Cr+6
HD001 6-6.5	JB51636-4	10/30/13	Soil	Metals, Cr+6
HD001 8-8.5	JB51636-5	10/30/13	Soil	Metals, Cr+6
FD006 9.5-10	JB51636-6	10/29/13	Soil	Metals, Cr+6
FD006 10-10.5	JB51636-7	10/29/13	Soil	Metals, Cr+6
FD006 10.5-11	JB51636-8	10/29/13	Soil	Metals, Cr+6
FD006 11-11.5	JB51636-9	10/29/13	Soil	Metals, Cr+6
FD007 4-4.5	JB51636-10	10/30/13	Soil	SPLP Leachate Ni
FD007 4-4.5	JB51636-11	10/30/13	Soil	Ni
FD007 5.5-6	JB51636-13	10/30/13	Soil	Metals, Cr+6
FD007 6.5-7	JB51636-14	10/30/13	Soil	Metals, Cr+6
FD007 7.5-8	JB51636-15	10/30/13	Soil	Metals, Cr+6
FD007 8.5-9	JB51636-16	10/30/13	Soil	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories in Orlando, FL. (Ni = nickel)				
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ.				

Data Review

Data, as presented in the analytical data package SDG JB51636, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. The data for the SPLP leachate analysis of sample JB51636-10 were also reviewed. Several sample results exhibited concentrations above the respective site remediation standard (SRS) in some of the 15 soil samples of this SDG. These consisted of six nickel results.

Laboratory Case Narrative

The metals analyses were performed at the Accutest Laboratories in Orlando, Florida after having received the samples in a properly preserved condition. The extensive case narrative identified all analytes for the samples that were diluted, listing them individually by analyte in random fashion. Matrix spike recoveries for antimony, chromium, and vanadium were identified as being outside QC limits in QC Batch MP26264, while duplicate analysis results for antimony, chromium, and nickel were said to be outside QC limits in the QC batch. Serial dilution results outside QC limits were indicated for chromium, nickel, and vanadium in the QC batch sample. All other QC requirements were met, including analyses for pH, oxidation reduction potential, total solids, and the SPLP leachate analysis. Details are discussed in the sections below. Consequently there were many

metals results that required qualification following the DV review, as discussed in the sections and tables below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the recoveries identified below.

The exceptions included the closing low calibration check standard in analytical run MA11181 (56%) for antimony. This low recovery did not significantly affect the reported results. The low "CRI" standard recovery in MA11181 was associated with the following samples: JB51636-1, -6, -7, -9, -11, -13, -14, -15, and -16. Because the reporting limits for these samples are above the affected range, the results are not subject to qualification. Additionally, the antimony results for these samples are already qualified as estimated values for low matrix spike recoveries and duplicate analysis outside QC limits. No additional qualification is warranted.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB51636.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony, chromium, and vanadium were below QC limits of 75% for QC sample JB51636-1 (HD001 0"-6"), as summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. None of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a possible low bias in the ability to recover the particular analyte in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Below QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	Post Digest. Spike	DV Qualifier	Potential Bias
MP26264 Ω	JB51636-1	Antimony	40.0 %	50.5 %	90.5 %	NJ-	Low
MP26264 Ω	JB51636-1	Chromium	65.6 %	95.2 %	92.8 %	NJ-	Low
MP26264 Ω	JB51636-1	Vanadium	32.0 %	37.7 %	104.5 %	NJ-	Low

QC Limits are 75-125%; Post-digestion spike QC is 80-120%
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a

potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate
 Ω – The samples associated with QC Batch MP26264 consist of JB51636-1 through -9 (inclusive), JB51636-11, and JB51636-13 through -16 (inclusive).

The low recoveries of antimony, chromium and vanadium in Sample JB51636-1 (HD001 0"-6") in the MS/MSD samples in QC Batch MP26264 are associated with thirteen samples with laboratory sample ID numbers ranging JB51636-1 through -9, and -13 through -16 (inclusive). The soil sample results qualified for the observed low matrix spike recoveries are presented below in summary table, Table 5, together with the results qualified for duplicate sample and serial dilution analysis results.

As observed in Table 5, antimony was detected in only four of the soil samples associated with the low spike recoveries. Although a possible low bias may raise question regarding the accuracy of these reported antimony results, the potential low bias represented by the approximately 50% spike recoveries, will not significantly affect interpretation of the antimony results because those samples with detected antimony concentrations have at least one other analyte above the SRS criterion. Similarly, the detected chromium and vanadium concentrations are considerably less than the SRS value, with detected chromium results being orders of magnitude less than the SRS of 120,000 mg/Kg.

Consequently, the potential low bias should not affect interpretation of the antimony, chromium or vanadium results in each of the samples associated with the low QC MS/MSD recoveries. Thus, the interpretation of these antimony, chromium and vanadium results appears to not significantly affected by any possible low bias in the soil sample concentrations.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on Sample JB51636-1 (HD001 0"-6"), as well as the spiked duplicate samples of JB51636-1 (HD001 0"-6") for the soil samples of this SDG. Soil sample aliquots from JB51636-1 had been spiked in duplicate, such that an evaluation of analytical precision for these spiked samples could also be evaluated. The differences between the duplicate soil sample aliquots were above the laboratory QC limit of 20%RPD for antimony(148.4%RPD) and nickel (110.3%RPD), as well as above the 35%RPD QC limit for soil samples recommended in DV guidelines (USEPA, 2010) for antimony and nickel. A possible cause of the observed differences between the duplicate results may be attributable to sample non-homogeneity. The differences between the spiked duplicate soil sample aliquots were below the 35%RPD QC limit recommended in DV guidelines for all five analytes.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
MP26264	JB51636-1	Antimony	148.4 %RPD	*J
MP26264	JB51636-1	Nickel	110.3 %RPD	*J

QC Limit is 35%RPD;

* – Duplicate analysis not within control limits; indeterminate bias direction.

J – The reported result is an estimated value.

Ω – The samples associated with QC Batch MP26264 consist of JB51636-1 through -9 (inclusive), JB51636-11, and JB51636-13 through -16 (inclusive).

Since antimony and nickel had exceeded the QC limit for duplicate soil sample analysis, the associated PPG samples with laboratory ID numbers ranging JB51636-1 through -9, -13 through -

16, as well as the nickel result in -11 were qualified as estimated values due to the potential variability in the analytical precision, and are flagged with “*J” in the summary table below, Table 5. All other duplicate analysis results met the QC limits for soil samples, either < 35%RPD, or were less than twice the CRDL value or reporting limit.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 97.0% - 104.4%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified that the chromium, nickel and vanadium serial dilution results were outside QC limits in QC Batch MP26264. These are detailed in Table 4 below. The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB51636-1 through -9, and -13 through -16, as well as the nickel; result in -11 are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 5, along with the results qualified for low matrix spike recoveries and variability in the analytical precision analysis.

Table 4. Serial Dilution Results Outside QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26264	JB51636-1	Chromium	16.9 %	EJ
MP26264	JB51636-1	Nickel	17.4 %	EJ
MP26264	JB51636-1	Vanadium	14.6 %	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

No field duplicate sample collection was requested.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported nickel results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The nickel concentration for Sample HD001 8-8.5 (JB51636-5) was listed as 1,450 mg/Kg on the reporting form and 19.78 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Nickel (mg/Kg)} &= \frac{(19.780 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.17 \text{ g}) (58.4\%/100\%)} = 1447.430 \mu\text{g/g} \\ &= 1,450 \text{ mg/Kg dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the nickel concentration of 1,450 mg/Kg for Sample HD001 8-8.5 was correctly reported. Note that the software incorporates the dilution

factor into the mg/L value in the raw data quant report, hence a dilution factor of only one (DF = 1) appears in the equation above.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of nine soil samples that had been diluted by a factor of either two or five for all five analytes or just a few select analytes. The reporting limits for the target analytes determined for the ICP analysis employing the various assigned laboratory instruments all were below the respective site remediation standards.

Summary of Metals Analysis

The soil sample analytical results for the samples of SDG JB51636 were found to be compliant with the analytical methods for the analysis of metals in the fifteen soil samples using SW-846 Method 6010C. All QC criteria were met for all ICP target analyte analyses, except for the low matrix spike recoveries for antimony, chromium, and vanadium in the QC batch. The soil samples collected September 29 and 30, 2013 are qualified as estimated values for antimony, chromium, and vanadium (flagged "NJ-") in the thirteen associated soil samples due to a potential low bias, as summarized below in Table 5. The antimony and nickel results are qualified as estimated values and flagged with "*J" in the thirteen associated soil samples, with the nickel result in JB51636-11 also flagged with "*J" due to possible variability in the analytical precision, as suggested by the results of the duplicate analysis. The serial dilution results were outside QC limits suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the chromium, nickel and vanadium results are qualified as estimated values and are flagged with "EJ" in Table 5 below, such that the combination of qualifiers appear as "ENJ-", "*EJ", and "ENJ-", respectively, for these three analytes.

Table 5. Summary Qualified Sample Metals Results in SDG JB51636

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
HD001 0"-6"	JB51636-1	Antimony	< 1.0	*NJ-
HD001 0"-6"	JB51636-1	Chromium	25.1	ENJ-
HD001 0"-6"	JB51636-1	Nickel	18.7	*EJ
HD001 0"-6"	JB51636-1	Vanadium	51.0	ENJ-
HD001 2-2.5	JB51636-2	Antimony	< 2.0	*NJ-
HD001 2-2.5	JB51636-2	Chromium	12.7	ENJ-
HD001 2-2.5	JB51636-2	Nickel	10.8	*EJ
HD001 2-2.5	JB51636-2	Vanadium	19.7	ENJ-
HD001 4-4.5	JB51636-3	Antimony	< 2.0	*NJ-
HD001 4-4.5	JB51636-3	Chromium	135	ENJ-
HD001 4-4.5	JB51636-3	Nickel	22.4	*EJ
HD001 4-4.5	JB51636-3	Vanadium	33.8	ENJ-
HD001 6-6.5	JB51636-4	Antimony	< 2.2	*NJ-
HD001 6-6.5	JB51636-4	Chromium	15.4	ENJ-
HD001 6-6.5	JB51636-4	Nickel	32.7	*EJ
HD001 6-6.5	JB51636-4	Vanadium	14.5	ENJ-
HD001 8-8.5	JB51636-5	Antimony	< 2.9	*NJ-
HD001 8-8.5	JB51636-5	Chromium	6.8	ENJ-
HD001 8-8.5	JB51636-5	Nickel	1450	*EJ
HD001 8-8.5	JB51636-5	Vanadium	26.6	ENJ-
FD006 9.5-10	JB51636-6	Antimony	5.0	*NJ-
FD006 9.5-10	JB51636-6	Chromium	787	ENJ-
FD006 9.5-10	JB51636-6	Nickel	42.7	*EJ
FD006 9.5-10	JB51636-6	Vanadium	29.0	ENJ-
FD006 10-10.5	JB51636-7	Antimony	3.3	*NJ-
FD006 10-10.5	JB51636-7	Chromium	411	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
FD006 10-10.5	JB51636-7	Nickel	26.3	*EJ
FD006 10-10.5	JB51636-7	Vanadium	17.7	ENJ-
FD006 10.5-11	JB51636-8	Antimony	< 2.5	*NJ-
FD006 10.5-11	JB51636-8	Chromium	57.6	ENJ-
FD006 10.5-11	JB51636-8	Nickel	44.6	*EJ
FD006 10.5-11	JB51636-8	Vanadium	22.5	ENJ-
FD006 11-11.5	JB51636-9	Antimony	2.2	*NJ-
FD006 11-11.5	JB51636-9	Chromium	95.0	ENJ-
FD006 11-11.5	JB51636-9	Nickel	51.2	*EJ
FD006 11-11.5	JB51636-9	Vanadium	50.1	ENJ-
FD007 4-4.5	JB51636-11	Nickel	14.1	*EJ
FD007 5.5-6	JB51636-13	Antimony	5.1	*NJ-
FD007 5.5-6	JB51636-13	Chromium	856	ENJ-
FD007 5.5-6	JB51636-13	Nickel	14.0	*EJ
FD007 5.5-6	JB51636-13	Vanadium	21.2	ENJ-
FD007 6.5-7	JB51636-14	Antimony	< 4.6	*NJ-
FD007 6.5-7	JB51636-14	Chromium	325	ENJ-
FD007 6.5-7	JB51636-14	Nickel	11.8	*EJ
FD007 6.5-7	JB51636-14	Vanadium	17.6	ENJ-
FD007 7.5-8	JB51636-15	Antimony	< 4.8	*NJ-
FD007 7.5-8	JB51636-15	Chromium	475	ENJ-
FD007 7.5-8	JB51636-15	Nickel	11.8	*EJ
FD007 7.5-8	JB51636-15	Vanadium	18.4	ENJ-
FD007 8.5-9	JB51636-16	Antimony	< 0.95	*NJ-
FD007 8.5-9	JB51636-16	Chromium	110	ENJ-
FD007 8.5-9	JB51636-16	Nickel	33.1	*EJ
FD007 8.5-9	JB51636-16	Vanadium	11.6	ENJ-

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J – Indicates an estimated value.
- J- – The result is an estimated value, but the result may be biased low.
- * – Duplicate analysis not within control limits; indeterminate bias direction.
- E – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁶⁺) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples.

The data validation of the analytical data was reviewed for the following data quality items:

- √ Holding times
- √ Blank Analysis
- √ Calibration standards
- √ Calibration verification
- √ Quantitation checks
- √ Data package completeness
- √ Matrix spike recoveries
- √ Duplicate analysis
- √ Laboratory control samples
- √ Serial dilution analysis
- √ Data qualifiers

A check mark (√) indicates successful achievement of meeting the relevant QC requirements.

Hexavalent chromium was detected in nine of the fourteen soil samples, with four concentrations exceeding the SRS of 20 mg/Kg. Because all QC requirements were met during the Cr⁺⁶ analysis, no hexavalent chromium results are qualified in this SDG.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with a value of 0.99979, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 94.8 % to 96.4 % for the QC batch associated with the 13 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%. No hexavalent chromium results required qualification.

Duplicate Sample Analysis

The duplicate analyses met QC requirements with values less than 16.5 %RPD, including Cr⁺⁶, redox potential and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries of 95.3% and 98.5%, thereby demonstrating acceptable analytical system performance.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample FD007 5.5-6 (JB51636-13) was listed as 71.9 mg/Kg on the reporting form and 0.734 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.734 \text{ mg/L} \times 0.1 \text{ L} \times 2}{0.00243 \text{ Kg} \times 84.0/100} = \frac{0.1468}{0.0020412} = 71.9185 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 71.9 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 71.9 mg/Kg for Sample FD007 5.5-6 was correctly reported. This was the highest detected Cr+6 concentration detected among the fourteen soil samples of this SDG, JB51636. This was one of four detected Cr+6 concentration results above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams, thereby demonstrating reducing conditions for the analyzed samples. No disparities relative to the reported values and characteristics were observed.

Summary of Wet Chemistry Analyses for SDG JB51636

No results were subject to qualification in the hexavalent chromium analyses, or the pH, redox potential or total solids analyses.

All sample results fell under the Eh/pH phase diagram line, indicating that reducing conditions in the soil matrix were demonstrated for the samples.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16*, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

USEPA, CLP, 2010, *"National Functional Guidelines for Inorganic Superfund Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

USEPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

USEPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

Westchester Community College, 1995, *CLP Inorganics Data Validation Course*, March, 1995.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 51636

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No

Indicate the identity of the samples and why. *Matrix interference*

2x JB 51636-2, 3, 4, 5, 8 (metals)
 2x JB 51636-13 (Cr⁶⁺)
 5x JB 51636-6 (Cr); 13-15 (for Sb, Cr, TI)

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Six nickel results: JB 51636-4, 5, 6, 8, 9, 16.

four Cr⁶⁺: JB 51636-6, 7, 11, 15.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, and 4 for details. Qualified sample results are presented in Table 5 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB51750
Sample Date: October 30 & 31, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
SPLP Leachate Analysis, EPA Method 1312
Reviewer: J. Giga. Ph.D., REP5554
Report Date: March 11, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-two (22) soil samples and two (2) field blanks (FBs) collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on October 30 and 31, 2013 for sample delivery group (SDG) JB51750. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB51750 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 22 collected soil samples and two FBs.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB51750-1 through -5 (inclusive), JB51750-7, JB51750-10 through -14, JB51750-16 through -20, JB51750-22 through -25, JB51750-27, and -28;
- Chromium (ENJ+) in Samples JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive);
- Chromium and vanadium (NJ+) in Samples, JB51750-16 through -20, JB51750-22 through -25, JB51750-27, and -28;
- Nickel and vanadium (EJ) in Samples JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive);
- Hexavalent chromium (NJ-) in Samples JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive);
- Hexavalent chromium (J) in field duplicate samples JB51750-20 and JB51750-25;

No other sample results in SDG JB51750 required qualification. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for 15 nickel results, three hexavalent chromium (Cr+6) and one antimony result.

The sample results that were subject to qualification following the DV review are presented in Tables 6 and 8 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-two (22) soil samples and two (2) field blanks collected October 30 and 31, 2013, were received October 31, 2013 at the Accutest laboratory with acceptable sampling cooler temperatures of 0.6°C. The samples destined for metals analysis were received at the Accutest Laboratory SE in Orlando, Florida November 2, 2013 preserved and in good condition with sampling cooler temperatures of 4.0°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
GD010 4.5-5	JB51750-1	10/30/13	Soil	Sb
GD010 4.5-5	JB51750-1A	10/30/13	Soil	SPLP Leachate Sb
GD010 8-8.5	JB51750-2	10/30/13	Soil	Metals, Cr+6
GD010 9-9.5	JB51750-3	10/30/13	Soil	Metals, Cr+6
GD010 10-10.5	JB51750-4	10/30/13	Soil	Metals, Cr+6
GD010 11-11.5	JB51750-5	10/30/13	Soil	Metals, Cr+6
GD009 8-8.5	JB51750-7	10/30/13	Soil	Metals, Cr+6
GD006 6-6.5	JB51750-10	10/31/13	Soil	Metals, Cr+6
GD006 7-7.5	JB51750-11	10/31/13	Soil	Metals, Cr+6
GD006 8-8.5	JB51750-12	10/31/13	Soil	Metals, Cr+6
GD006 9-9.5	JB51750-13	10/31/13	Soil	Metals, Cr+6
DUP 02	JB51750-14	10/31/13	Soil	Metals, Cr+6
GD005 6-6.5	JB51750-16	10/31/13	Soil	Metals, Cr+6
GD005 7-7.5	JB51750-17	10/31/13	Soil	Metals, Cr+6
GD005 8-8.5	JB51750-18	10/31/13	Soil	Metals, Cr+6
GD005 9-9.5	JB51750-19	10/31/13	Soil	Metals, Cr+6
DUP 03	JB51750-20	10/31/13	Soil	Metals, Cr+6
GD007 5.5-6	JB51750-22	10/31/13	Soil	Metals, Cr+6
GD007 6.5-7	JB51750-23	10/31/13	Soil	Metals, Cr+6
GD007 7.5-8	JB51750-24	10/31/13	Soil	Metals, Cr+6
GD007 8.5-9	JB51750-25	10/31/13	Soil	Metals, Cr+6
GD008 6-6.5	JB51750-27	10/31/13	Soil	Metals, Cr+6
GD008 7-7.5	JB51750-28	10/31/13	Soil	Metals, Cr+6
FB 02	JB51750-29	10/31/13	Aqueous	Metals, Cr+6
FB 03	JB51750-30	10/31/13	Aqueous	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando, FL. (Sb = antimony);
 SPLP Leachate analyzed for antimony using prep method 1312, and 6010C.
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB51750, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | Field duplicate sample analysis |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Sample JB51750-1 was analyzed for antimony, while JB51750-1A was analyzed for the SPLP leachate analysis of antimony. Several sample results exhibited concentrations above the respective site remediation

standard (SRS) in some of the 22 soil samples of this SDG. These included 15 nickel and one antimony result.

Laboratory Case Narrative

The extensive case narrative identified all analytes for the samples that were diluted, listing them individually by analyte in random fashion. Matrix spike recoveries for antimony and chromium were identified as being outside QC limits in QC Batch MP26265 and antimony, chromium, and vanadium were identified as being outside QC limits in QC Batch MP26327. The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26265 for chromium, nickel, and vanadium and stated that the differences were acceptable due to low initial sample concentration (< 50 times IDL). However, each of these three analyte concentrations in QC Sample JB51679-1 were clearly above the criterion of 50 times IDL and thus, are subject to qualification, as is discussed below. All other QC requirements were met, including analyses for pH, oxidation reduction potential, total solids, and the leachate analysis. Details are discussed in the sections below. The metals analyses were performed at the Accutest Laboratories Southeast in Orlando, Florida.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard area counts identified below.

The exceptions included the internal standard area counts for IS#2 which is associated with chromium and vanadium in analytical run MA11182. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, the two affected samples in MA11182, JB51750-10 (128%) and -11 (126%) were not reanalyzed, as the IS area counts are considered acceptable.

In the analytical sequence MA11202, the area counts for JB51750-1 and -22 were identified as being outside QC limits on the QC summary report. However, review of the data revealed that the area counts for IS#2 for JB51750-1 (121%) and JB51750-22 (123%) were actually within the previous QC limits of 60-125%. Thus, the samples did not warrant reanalysis and the results for chromium and vanadium are considered acceptable for these two samples.

No soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB51750.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony, chromium, and vanadium were outside QC limits of 75 - 125% for QC samples in the two identified QC batches, as summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. None of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with either "J+" or "J-" to indicate the possible presence of a possible high or low bias in the ability to recover the particular analyte in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26265 Ω	JB51679-1	Antimony	26.5 %	26.8 %	NJ-	Low
MP26265 Ω	JB51679-1	Chromium	128.5 %	87.8 %	NJ+	High
MP26327 †	FA9687-1	Antimony	44.7 %	54.4 %	NJ-	Low
MP26327 †	FA9687-1	Chromium	171.8%	137.6 %	NJ+	High
MP26327 †	FA9687-1	Vanadium	157.1 %	130.1 %	NJ+	High

QC Limits are 75-125%;
NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.
MS – Matrix spike
MSD – Matrix spike duplicate
Ω – The samples associated with QC Batch MP26265 consist of JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive);
† – The samples associated with QC Batch MP26327 consist of JB51750-1, JB51750-16 through -20, JB51750-22 through -25, JB51750-27, and JB51750-28.

The spike recoveries for chromium were observed to be biased high, however, the chromium concentration in the initial QC sample (FA9687-1) was almost four times the spike amount and some masking of the spike might have been partially responsible for the elevated MS/MSD recoveries. The chromium results in the associated samples were qualified as estimated values and flagged with "NJ+" due to a potential positive bias in the ability to recover chromium in the associated samples, which included those with laboratory sample ID numbers JB51750-1, JB51750-16 through -20, -22 through -25, -27, and -28. The chromium MS recovery in the other QC batch was also above QC limits. Since these samples are associated with an elevated serial dilution result, the chromium results in the following samples are flagged with "ENJ+", as seen in the cumulative table, Table 6: JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive). The vanadium results for these samples are also flagged with "NJ+", while the antimony results in all of these samples and JB51750-1 are flagged with "NJ-" due to a potential low bias. These results qualified for matrix spike recoveries are presented below in summary table, Table 6, together with the results qualified for serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on two QC samples and on two pairs of spiked duplicate samples. All %RPD values were below the QC limit of 35%RPD for soil samples and no results required qualification. The RPD values ranged 0-31.8 %RPD for the duplicate samples analyses, and 2.3-19.5%RPD for the spiked duplicate data. Thus, the duplicate analyses demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 91.1% - 102.4%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26265 for chromium, nickel, and vanadium and stated that the differences were acceptable due to low initial sample concentration (< 50 times IDL). However, each of these three analyte concentrations in JB51679-1 were clearly above the criterion of 50 times IDL and thus, are subject to qualification, as is discussed below. These are detailed in Table 3 below.

Table 3. Serial Dilution Results Outside QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26265 Ω	JB51679-1	Chromium	46.3 %	EJ
MP26265 Ω	JB51679-1	Nickel	47.3 %	EJ
MP26265 Ω	JB51679-1	Vanadium	24.6 %	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26265 consist of JB51750-2 through -5, JB51750-7, and JB51750-10 through -14 (inclusive).

The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB51750-2 through -5, -7, and -10 through -14, inclusive, are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 6, along with the results qualified for matrix spike recoveries outside QC limits.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

Two sets of field duplicate samples were collected as part of SDG JB51750. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying results from the USEPA CLP program for soil samples analyzed by ICP-AES using the CLP Statement of Work (SOW) ISM01.X (but not Method 6010C) that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2012; AECOM, 2010).

The results for the analysis of the two pairs of field duplicate samples are presented in Table 4, below. It is evident that the results for the metals analytes that were detected in the field duplicate samples were very similar and, thus, considered representative, as the concentrations between

field duplicate samples differed by less than 43 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all analyte pairs, except for the chromium results for the field duplicates from GD005 9-9.5, thereby meeting the QC limits for field duplicate samples for all but one parameter.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB51750

Analyte	GD005 9-9.5 (mg/Kg)	DUP 02 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.8 NJ-	< 0.93 NJ-	< 2 × CRQL	-
Chromium	20.0 NJ+	45.5 ENJ+	77.9 %	(J)
Nickel	31.0	27.5 EJ	12.0 %	-
Thallium	< 2.4	< 0.46	< 2 × CRQL	-
Vanadium	22.0 NJ+	14.3 EJ	42.4 %	-
Analyte	GD007 8.5-9 (mg/Kg)	DUP 03 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.5 NJ-	< 4.6 NJ-	< 2 × CRQL	-
Chromium	28.4 NJ+	28.7 NJ+	1.0 %	-
Nickel	23.3	22.9	1.7 %	-
Thallium	< 2.3	< 2.3	< 2 × CRQL	-
Vanadium	20.0 NJ+	18.8 NJ+	6.2 %	-

NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
 < – The analyte was not detected at the stated reporting limit.
 EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
 (J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy;
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit.
 < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

This pair of field duplicate samples demonstrated acceptable sampling representativeness and precision for the five target metals analyzed. The only results subject to qualification were the chromium results for samples GD005 9-9.5 and DUP 02. However, since these chromium results are qualified for elevated MS recoveries and exhibit a potential positive bias, the results were not flagged with an additional “J” flag in order to avoid redundancy in qualifiers.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)

V = final volume (mL)
 DF = Dilution factor
 W = wet weight (g)
 TS = Total solids (%)
 1000 = conversion factor (mL/L)

The nickel concentration for Sample GD005 6-6.5 (JB51750-16) was listed as 31.0 mg/Kg on the reporting form, a value equal to the SRS, and 0.5793 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Nickel (mg/Kg)} = \frac{(579.3 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.07 \text{ g}) (87.2\%/100\%)} = \frac{28,965.0}{933.04} = 31.0437 \mu\text{g/g}$$

$$= 31.0 \text{ mg/Kg dry weight}$$

After rounding to three significant figures, this verifies that the nickel concentration of 31.0 mg/Kg, a value equal to the SRS for nickel, in Sample GD005 6-6.5 was correctly reported.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 13 of the 22 soil samples that had been diluted by a factor of either two, four, five or ten for metals analysis, while two samples were diluted by a factor of 5x for Cr+6 analysis due to elevated Cr+6 concentrations above the calibration range of the instrument.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where Sample JB51750-22 was diluted by a factor of 10x, thereby raising the reporting limit for the thallium result above the respective SRS criterion, as presented below in Table 5, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 5. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
GD007 5.5-6	JB51750-22	Thallium	< 0.53	10	< 5.3	3
Units – mg/Kg < - The analyte was analyzed for, but was not detected above the stated reporting limit. NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.						

The interpretation of the thallium result (<5.3) in JB51750-22 was not significantly compromised by the applied dilution or raised reporting limits, because the nickel concentration in this sample was above the SRS of 31 mg/Kg and, thus, this sample is potentially subject to some sort of response action or further evaluation.

Summary of Metals Analysis

The soil sample analytical results for the samples of SDG JB51750 were found to be compliant with the analytical methods for the analysis of metals in the 22 soil samples and two field blanks using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the matrix spike recoveries above or below QC limits, and differences in the serial dilution analysis, as summarized in Tables 2 and 3. The individual associated sample results are qualified accordingly and listed in Table 6 below. Sample analyte results are flagged with either "NJ-", "NJ+", "EJ", or "ENJ+".

The QC criteria were met for all ICP target analyte analyses, except for the low matrix spike recoveries for antimony in both soil matrix QC batches and elevated MS recoveries for chromium in both QC batches with elevated MS/MSD recoveries for vanadium in QC Batch MP26327. The soil samples collected October 30 and 31, 2013 are qualified as estimated values for antimony ("NJ-"), chromium ("NJ+" or "ENJ+"), and vanadium (flagged "NJ+" or "EJ") in the associated soil samples due to a potential low or high bias, as summarized in Table 2 and individually listed below in Table 6, or for potential variability in the reported concentrations due to the presence of some interference in the sample matrix (those results flagged with an "E"), as summarized above in Table 3.

Table 6. Summary Qualified Sample Metals Results in SDG JB51750

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD010 4.5-5	JB51750-1	Antimony	1.4	NJ-
GD010 8-8.5	JB51750-2	Antimony	< 0.93	NJ-
GD010 8-8.5	JB51750-2	Chromium	24.5	ENJ+
GD010 8-8.5	JB51750-2	Nickel	57.7	EJ
GD010 8-8.5	JB51750-2	Vanadium	10.7	EJ
GD010 9-9.5	JB51750-3	Antimony	< 0.95	NJ-
GD010 9-9.5	JB51750-3	Chromium	60.0	ENJ+
GD010 9-9.5	JB51750-3	Nickel	34.8	EJ
GD010 9-9.5	JB51750-3	Vanadium	11.2	EJ
GD010 10-10.5	JB51750-4	Antimony	< 0.98	NJ-
GD010 10-10.5	JB51750-4	Chromium	28.7	ENJ+
GD010 10-10.5	JB51750-4	Nickel	69.9	EJ
GD010 10-10.5	JB51750-4	Vanadium	29.8	EJ
GD010 11-11.5	JB51750-5	Antimony	< 1.8	NJ-
GD010 11-11.5	JB51750-5	Chromium	23.8	ENJ+
GD010 11-11.5	JB51750-5	Nickel	15.5	EJ
GD010 11-11.5	JB51750-5	Vanadium	40.6	EJ
GD009 8-8.5	JB51750-7	Antimony	< 0.94	NJ-
GD009 8-8.5	JB51750-7	Chromium	43.3	ENJ+
GD009 8-8.5	JB51750-7	Nickel	52.1	EJ
GD009 8-8.5	JB51750-7	Vanadium	10.0	EJ
GD006 6-6.5	JB51750-10	Antimony	11.3	NJ-
GD006 6-6.5	JB51750-10	Chromium	1,500	ENJ+
GD006 6-6.5	JB51750-10	Nickel	31.4	EJ
GD006 6-6.5	JB51750-10	Vanadium	25.9	EJ
GD006 7-7.5	JB51750-11	Antimony	< 0.86	NJ-
GD006 7-7.5	JB51750-11	Chromium	122	ENJ+
GD006 7-7.5	JB51750-11	Nickel	27.5	EJ
GD006 7-7.5	JB51750-11	Vanadium	14.9	EJ
GD006 8-8.5	JB51750-12	Antimony	< 0.89	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD006 8-8.5	JB51750-12	Chromium	12.4	ENJ+
GD006 8-8.5	JB51750-12	Nickel	33.5	EJ
GD006 8-8.5	JB51750-12	Vanadium	11.6	EJ
GD006 9-9.5	JB51750-13	Antimony	< 0.91	NJ-
GD006 9-9.5	JB51750-13	Chromium	18.4	ENJ+
GD006 9-9.5	JB51750-13	Nickel	31.6	EJ
GD006 9-9.5	JB51750-13	Vanadium	10.4	EJ
DUP 02	JB51750-14	Antimony	< 0.93	NJ-
DUP 02	JB51750-14	Chromium	45.5	ENJ+
DUP 02	JB51750-14	Nickel	27.5	EJ
DUP 02	JB51750-14	Vanadium	14.3	EJ
GD005 6-6.5	JB51750-16	Antimony	< 4.3	NJ-
GD005 6-6.5	JB51750-16	Chromium	206	NJ+
GD005 6-6.5	JB51750-16	Vanadium	26.0	NJ+
GD005 7-7.5	JB51750-17	Antimony	< 4.1	NJ-
GD005 7-7.5	JB51750-17	Chromium	30.6	NJ+
GD005 7-7.5	JB51750-17	Vanadium	18.2	NJ+
GD005 8-8.5	JB51750-18	Antimony	< 3.5	NJ-
GD005 8-8.5	JB51750-18	Chromium	54.0	NJ+
GD005 8-8.5	JB51750-18	Vanadium	17.3	NJ+
GD005 9-9.5	JB51750-19	Antimony	< 4.8	NJ-
GD005 9-9.5	JB51750-19	Chromium	20.0	NJ+
GD005 9-9.5	JB51750-19	Vanadium	22.0	NJ+
DUP 03	JB51750-20	Antimony	< 4.6	NJ-
DUP 03	JB51750-20	Chromium	28.7	NJ+
DUP 03	JB51750-20	Vanadium	18.8	NJ+
GD007 5.5-6	JB51750-22	Antimony	11.1	NJ-
GD007 5.5-6	JB51750-22	Chromium	1,240	NJ+
GD007 5.5-6	JB51750-22	Vanadium	< 26	N
GD007 6.5-7	JB51750-23	Antimony	< 4.8	NJ-
GD007 6.5-7	JB51750-23	Chromium	64.8	NJ+
GD007 6.5-7	JB51750-23	Vanadium	21.1	NJ+
GD007 7.5-8	JB51750-24	Antimony	< 4.9	NJ-
GD007 7.5-8	JB51750-24	Chromium	43.7	NJ+
GD007 7.5-8	JB51750-24	Vanadium	19.9	NJ+
GD007 8.5-9	JB51750-25	Antimony	< 4.5	NJ-
GD007 8.5-9	JB51750-25	Chromium	28.4	NJ+
GD007 8.5-9	JB51750-25	Vanadium	20.0	NJ+
GD008 6-6.5	JB51750-27	Antimony	< 4.8	NJ-
GD008 6-6.5	JB51750-27	Chromium	177	NJ+
GD008 6-6.5	JB51750-27	Vanadium	27.5	NJ+
GD008 7-7.5	JB51750-28	Antimony	< 5.0	NJ-
GD008 7-7.5	JB51750-28	Chromium	102	NJ+
GD008 7-7.5	JB51750-28	Vanadium	23.7	NJ+

Key:

- < – The analyte was analyzed for, but was not detected above the stated reporting limit.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J – Indicates an estimated value.
- J+ – The result is an estimated value, but the result may be biased high.
- J- – The result is an estimated value, but the result may be biased low.
- E – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one QC batch for the single field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Field Duplicate Sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

Hexavalent chromium was detected in nineteen of the 21 soil samples analyzed for hexavalent chromium, with three concentrations exceeding the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries, except for the low soluble MS recovery in QC Batch GP75798.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values all exceeding 0.99989, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 96.0% to 100.1% for the two QC batches associated with the 21 soil samples, and 99.5% to 99.7% for the QC batch associated with the two field blank samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or the field blanks. Thus, no sample results are affected or qualified for any potential QC blank contamination. Hexavalent chromium was not detected in the field blanks at a reporting limit of 0.010 mg/L.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, except for the soluble MS recovery for JB51750-2 in QC Batch GP75798, as noted in Table 7. The 68.2% soluble matrix spike recovery for hexavalent chromium was below the QC limits of 75-125% for batch QC Sample JB51750-2 in QC Batch GP75798, which indicates possible matrix interference. All other matrix spike recoveries were within the respective QC limits.

Table 7. Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75798 E	JB51750-2	Cr ⁺⁶ , soluble	68.2 %	NJ-	Low

GP75798 £	JB51750-2	Cr ⁺⁶ , insoluble	96.2 %	----	----
GP75798 £	JB51750-2	Cr ⁺⁶ , post spike	92.2 %	----	----
GP75802 §	JB51750-23	Cr ⁺⁶ , soluble	80.5 %	----	----
GP75802 §	JB51750-23	Cr ⁺⁶ , insoluble	104.3 %	---	----
GP75802 §	JB51750-23	Cr ⁺⁶ , post spike	102 %	---	---
GN94224 Θ	JB51770-1	Cr ⁺⁶ , soluble	103.8 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike.
 £ – The samples associated with QC Batch GP75798 consist of JB51750-2 through -5, JB51750-7, JB51750-10 through -14 (inclusive).
 § – The samples associated with QC Batch GP75802 consist of JB51750-16 through -20, JB51750-22 through -25, JB51750-27, and JB51750-28.
 Θ – The samples associated with QC Batch GN94224 consist of field blanks JB51750-29 and -30.

The soluble MS recovery of 68.2% was below QC limits for Cr⁺⁶ for the spiked sample from sampling location GD010 8-8.5 in the soil sample analysis in QC Batch GP75798 which was associated with 10 soil samples with lab sample IDs of JB51750-2 through -5, JB51750-7, JB51750-10 through -14 (inclusive).

Applying the DV guidelines that are based on SW-846 Method 7196A (NJDEP, 2005), the hexavalent chromium results for the associated ten soil samples are, consequently, qualified as estimated values and flagged with “NJ-” due to the potential low bias in the ability to recover this analyte in the soil matrix. These qualified results are presented below in Table 9.

Duplicate Sample Analysis

All duplicate analyses met QC requirements with values less than 12.6 %RPD, including Cr+6, redox potential and pH analyses, except for the 24.6%RPD for the duplicate analysis associated with the field blanks. Although the 24.5%RPD for Cr⁺⁶ was above the laboratory QC limit for the duplicate analysis of the non-client sample JB51770-1 in GN94224, the value is Acceptable because of the low sample concentrations which differ by less than the DV QC guideline of > CRQL (USEPA, 2010; USEPA, 2006) when sample concentrations are low (< 5 × RL). Consequently, no sample results associated with this SDG, SDG JB51750, are subject to qualification for analytical precision issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries between 86.1% and 97.3% for the soil sample analyses, and 106.7% for the analysis associated with the field blanks, thereby demonstrating acceptable analytical system performance.

Field Duplicate Analysis

The results for the analysis of the two pairs of field duplicate samples are presented in Table 8, below. It is evident that the results of the detected results of sample GD005 9-9.5 and its field duplicate (1.2 and 1.1 mg/Kg) were almost identical, thereby meeting the QC limit of < 2 × CRQL when sample concentrations are below five times the reporting limit. The detected results for the field duplicate samples from GD005 9-9.5 are very similar and, thus, considered representative.

The results of the detected Cr+6 concentration (1.6 mg/Kg) in GD007 8.5-9 and the non-detect result (< 0.49 mg/Kg) of DUP 03 exhibited a difference of >2 × CRQL and, thus, are subject to qualification as estimated values and are to be flagged with “J” in Table 8 below.

Table 8. Comparison of Field Duplicate Soil Sample Results.

Analyte	GD005 9-9.5 (mg/Kg)	DUP 02 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	1.2	1.1 NJ-	< 2 × CRQL	-
Analyte	GD007 8.5-9 (mg/Kg)	DUP 03 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	1.6	< 0.49	> 2 × CRQL	J

< – The analyte was not detected at the stated reporting limit
 NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is not within QC limits; possible low bias.
 J – The reported result is an estimated value.
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit.
 < 2 × CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches. This is not a required analysis of the method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$Cr^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

- Where:
- A = conc. from calibration curve (mg/L)
 - B = Final digested volume (L)
 - C = Wet wt of sample (Kg)
 - D = % Solids/100
 - E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample GD006 6-6.5 (JB51750-10) was listed as 110 mg/Kg on the reporting form and 0.4604 mg/L on the quantitation report in the raw data for a 5-fold dilution analysis. A calculation check provides the following result:

$$Cr^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$Cr^{+6} \text{ (mg/Kg)} = \frac{0.4604 \text{ mg/L} \times 0.1 \text{ L} \times 5}{0.00241 \text{ Kg} \times 87.0/100} = \frac{0.2302}{0.0020967} = 109.7915 \text{ mg/Kg}$$

$$Cr^{+6} \text{ (mg/Kg)} = 110 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 110 mg/Kg for Sample GD006 6-6.5 was correctly reported. This was the highest detected Cr+6

concentration detected among the 21 soil samples of this SDG, JB51750 analyzed for hexavalent chromium. This was one of three detected Cr+6 concentrations result above the SRS of 20 mg/Kg. All remaining Cr+6 concentrations were below 11.2 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

All of the 21 soil samples fell below the Eh-pH phase diagram line. These results suggest that all of the samples experience conditions of a “reducing” soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase.

Summary of Cr+6 Analysis

Due to the low MS recovery for the soluble spike in QC Batch GP75798 associated with 10 soil samples, the Cr⁺⁶ results in the associated 10 soil samples are qualified as estimated values and flagged with “NJ-” due to a low soluble MS recovery. The hexavalent chromium results for the two field duplicate samples from GD007 8.5-9 were qualified as estimated values and flagged with “J” because the difference between these results differed by more than the QC limit for sampling representativeness. No other Cr+6 results were subject to qualification in the hexavalent chromium analyses, or the pH, redox potential or total solids analyses. The qualified Cr+6 results following the DV review are presented below in Table 9.

Table 9. Summary of Qualified Sample Hexavalent Chromium Results for SDG JB51750

Sample	Client ID	Analyte	Result (mg/Kg)	DV Qualifier
GD010 8-8.5	JB51750-2	Hexavalent chromium	5.0	NJ-
GD010 9-9.5	JB51750-3	Hexavalent chromium	41.5	NJ-
GD010 10-10.5	JB51750-4	Hexavalent chromium	6.1	NJ-
GD010 11-11.5	JB51750-5	Hexavalent chromium	< 0.44	NJ-
GD009 8-8.5	JB51750-7	Hexavalent chromium	11.2	NJ-
GD006 6-6.5	JB51750-10	Hexavalent chromium	110	NJ-
GD006 7-7.5	JB51750-11	Hexavalent chromium	96.4	NJ-
GD006 8-8.5	JB51750-12	Hexavalent chromium	4.3	NJ-
GD006 9-9.5	JB51750-13	Hexavalent chromium	7.5	NJ-
DUP 02	JB51750-14	Hexavalent chromium	1.1	NJ-
DUP 03	JB51750-20	Hexavalent chromium	< 0.49	J
GD007 8.5-9	JB51750-25	Hexavalent chromium	1.6	J

< – The analyte was analyzed for, but not detected at the specified reporting limit.
 NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is not within QC limits; possible low bias.
 J – The reported result is an estimated value.

Other than qualifying the Cr⁺⁶ results in the ten soil samples with “NJ-” due to a low soluble MS recovery and the two field duplicate sample results, no other Cr+6 results were subject to qualification in the hexavalent chromium analyses in samples of SDG JB51750.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

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US EPA, CLP, 2010, *"National Functional Guidelines for Inorganic Superfund Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 51750

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why. *Matrix interference for metals*

analysis of high Cr⁺⁶ concentrations above calibration range.
 (2x) JB 51750 - 5; (10x) JB 51750 - 10, 22.
 (4x) JB 51750 - 16, 17, 18, 19, 20.
 (5x) JB 51750 - 23, 24, 25, 27, 28; Cr⁺⁶ (5x) JB 51750 - 10, 11.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

*Antimony in JB 51750-10
 Thallium in JB 51750-22*

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

*Fifteen nickel: JB 51750 - 2, 3, 4, 7, 10, 12, 13, 16, 17, 18, 19, 22, 23, 24, 28.
 One antimony: JB 51750-22
 Three Cr⁺⁶: JB 51750-3, 10, 11.*

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No analytical procedural problems were noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 7 and 8 for details.

Qualified sample results are presented in tables 6 and 9 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB51908
Sample Date: October 31 and November 1, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewers: Faiza M. Botros
Janis V. Giga, Ph.D., REP 5554
Report Date: February 6, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-seven (27) soil samples and one (1) Field Blank collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on October 31 and November 01, 2013 for sample delivery group (SDG) JB51908. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB51908 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 27 collected soil samples and one Field Blank aqueous sample.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB51908-2 through -13 (inclusive), JB51908-16 through -19, -21 through -25, JB51908-27 through -29, and JB51908-32 through -34 (inclusive);
- Chromium (ENJ-) in Samples JB51908-2 through -13 (inclusive), JB51908-16 through -19, and JB51908-21 through -23 (inclusive);
- Chromium (EJ) in Samples JB51908-24 through -25, JB51908-27 through -29, and JB51908-32 through -34 (inclusive);
- Nickel (EJ) in Samples JB51908-2 through -13 (inclusive), JB51908-16 through -19, -21 through -25, JB51908-27 through -29, and JB51908-32 through -34 (inclusive);
- Vanadium (ENJ-) in Samples JB51908-2 through -13 (inclusive), JB51908-16 through -19, and JB51908-21 through -23 (inclusive);

No other sample results in SDG JB51908 required qualification, including the hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. All but two reported Cr+6 concentrations were below the respective site remediation standard (SRS) limits, while 18 nickel and one vanadium result exceeded the respective SRS value.

The individual sample results that were qualified following the DV review are identified in Table 6 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-seven (27) soil and one (1) Field Blank samples collected on October 31 and November 01, 2013, were received November 1, 2013 at the Accutest laboratory in Dayton, NJ intact and chemically preserved with acceptable sampling cooler temperatures of 4.6°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. in Orlando Florida on November 6, 2013 properly preserved and intact with sampling cooler temperatures of 2.8°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
GD004 5.5-6	JB51908-2	10/31/13	Soil	Metals, Cr ⁺⁶
GD004 6.5-7	JB51908-3	10/31/13	Soil	Metals, Cr ⁺⁶
GD004 7.5-8	JB51908-4	10/31/13	Soil	Metals, Cr ⁺⁶
GD002 0"-6"	JB51908-5	10/31/13	Soil	Metals, Cr ⁺⁶
GD002 2-2.5	JB51908-6	10/31/13	Soil	Metals, Cr ⁺⁶
GD002 4-4.5	JB51908-7	10/31/13	Soil	Metals, Cr ⁺⁶
GD002 6-6.5	JB51908-8	10/31/13	Soil	Metals, Cr ⁺⁶
GD002 8-8.5	JB51908-9	10/31/13	Soil	Metals, Cr ⁺⁶
GD003 5-5.5	JB51908-10	11/01/13	Soil	Metals, Cr ⁺⁶
GD003 6-6.5	JB51908-11	11/01/13	Soil	Metals, Cr ⁺⁶
GD003 7-7.5	JB51908-12	11/01/13	Soil	Metals, Cr ⁺⁶
GD003 8-8.5	JB51908-13	11/01/13	Soil	Metals, Cr ⁺⁶
FD002 4.5-5	JB51908-16	11/01/13	Soil	Metals, Cr ⁺⁶
FD002 5.5-6	JB51908-17	11/01/13	Soil	Metals, Cr ⁺⁶
FD002 6.5-7	JB51908-18	11/01/13	Soil	Metals, Cr ⁺⁶
FD002 7.5-8	JB51908-19	11/01/13	Soil	Metals, Cr ⁺⁶
ED009 5-5.5	JB51908-21	11/01/13	Soil	Metals, Cr ⁺⁶
DUP 04	JB51908-22	11/01/13	Soil	Metals, Cr ⁺⁶
ED009 6-6.5	JB51908-23	11/01/13	Soil	Metals, Cr ⁺⁶
ED009 7-7.5	JB51908-24	11/01/13	Soil	Metals, Cr ⁺⁶
ED009 8-8.5	JB51908-25	11/01/13	Soil	Metals, Cr ⁺⁶
ED011 6-6.5	JB51908-27	11/01/13	Soil	Metals, Cr ⁺⁶
ED011 7-7.5	JB51908-28	11/01/13	Soil	Metals, Cr ⁺⁶
ED011 8-8.5	JB51908-29	11/01/13	Soil	Metals, Cr ⁺⁶
ED012 8.5-9	JB51908-32	11/01/13	Soil	Metals, Cr ⁺⁶
ED012 9.5-10	JB51908-33	11/01/13	Soil	Metals, Cr ⁺⁶
ED012 10.5-11	JB51908-34	11/01/13	Soil	Metals, Cr ⁺⁶
FB 04	JB51908-35	11/01/13	Aqueous	Metals, Cr ⁺⁶
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast in Orlando FL;				
Cr ⁺⁶ – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB51908, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgment, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Eighteen (18) nickel concentrations and one vanadium results exceeded the respective site remediation standard (SRS) levels of the 27 soil samples of this SDG.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) recoveries for antimony, chromium and vanadium were outside control limits, while the and matrix spike duplicate (MSD) recoveries for antimony and chromium were identified as being outside QC limits in QC Batch MP26337 and the MS/MSD recoveries for antimony were outside QC limits for MP26338. The case narrative identified antimony as having an MS recovery outside QC limits and antimony and chromium outside QC limits in the MSD analysis. However, the chromium recovery of 122% was within DV QC limits of 75-125% (NJDEP, 2002).

The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26337 for antimony, chromium, nickel and vanadium and stated that the percent difference was acceptable due to low initial sample concentration (< 50 times IDL). This statement conflicted with other statements indicating that the serial dilution results for chromium, nickel, and vanadium indicate possible matrix interference. Apparently this statement should only be applied for antimony. Similar conflicting statements were made regarding the serial dilution results for QC Batch MP26338 for antimony, chromium and nickel. Elevated reporting limits were listed in the case narrative for most analytes in many samples.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all inductively coupled argon plasma emission spectrometer (ICP)-analyzed samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There were, however, a few exceptions.

There were several samples whose internal standard (IS#2) area count was above the identified QC limits in analytical sequence MA11209 and one sample in MA11205. Internal standard IS#2 is associated with chromium and vanadium. In the analytical sequence MA11205, the area count for IS #2 in JB51908-27 was identified as being outside QC limits on the QC summary report, while samples JB51908-11, -21, -22, and -23 in MA11209 exceeded the listed QC range of 60-125%. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Review of the data revealed that the area counts for IS#2 (ranging 125%-129%) in each of these samples were actually within the updated QC limits of 70-130%. Thus, these samples did not warrant reanalysis and the results for chromium and vanadium are considered acceptable. Consequently, the affected samples in MA11205 and MA11209 were not reanalyzed, as the IS area counts are considered acceptable by the laboratory. Consequently, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB51908.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were below QC limits of 75 - 125% for QC samples in the two identified QC batches associated with the 27 soil samples which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. The MS/MSD recoveries for chromium and the MS recovery for vanadium were also below QC limits in QC Batch MP26337. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover these analytes in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26337 Ω	JB51908-2	Antimony	20.2 %	16.4 %	NJ-	Low
MP26337 Ω	JB51908-2	Chromium	39.8 %	30.4 %	NJ-	Low
MP26337 Ω	JB51908-2	Vanadium	65.9 %	80.0 %	NJ-	Low
MP26338 †	FA9803-1	Antimony	57.4 %	52.0 %	NJ-	Low

QC Limits are 75-125%;
NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
MS – Matrix spike
MSD – Matrix spike duplicate.
Ω – The samples associated with QC Batch MP26337 consist of JB51908-2 through -13, JB51908-16 through -19, and JB51908-21 through -23 (inclusive);
† – The samples associated with QC Batch MP26338 consist of JB51908-24, -25, JB51908-27 through -29, JB51908-32 through -34 (inclusive).

The antimony results in all of these affected samples are flagged with "NJ-" due to a potential low bias, as were the chromium and vanadium results in samples associated with QC Batch MP26337. These qualified results are presented below in summary table, Table 6, together with the results qualified for serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on two soil samples and one aqueous sample with those samples also spiked in duplicate as a means of assessing the analytical precision. All %RPD values were below the QC limit of 35%RPD for soils and 20%RPD for aqueous samples, except for the 200%RPD results in the aqueous QC sample. However, the difference did meet the < CRQL QC limit for low concentration samples. Otherwise, the soil %RPD values were less than 10.5%RPD (with a 29.2%RPD value for one antimony result), and 0 to 4.4%RPD for the remaining aqueous results and no results required qualification. The duplicate analyses demonstrated very good analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 91.8% - 104.0% for the soil sample metals analysis, and 94.5 – 101.8% for the aqueous blank spike.

Serial Dilution Analysis (QC Limit $\leq 10\%$ D)

The case narrative stated that the RPDs for antimony, chromium, nickel and vanadium are outside QC limits in QC Batch MP26337, and for antimony, chromium and nickel in MP26338, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, these two statements were not correct, since the respective initial concentrations for chromium, nickel and vanadium were clearly above the $50 \times$ IDL criterion and are, thus, subject to qualification, as identified below in Table 3. The case narrative also mentioned that the serial dilution results for chromium, nickel and vanadium indicate possible matrix interference.

Table 3. Serial Dilution Results Above QC Limits – SDG JB51908

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26337 Ω	JB51908-2	Chromium	28.8 %D	EJ
MP26337 Ω	JB51908-2	Nickel	27.0 %D	EJ
MP26337 Ω	JB51908-2	Vanadium	26.3 %D	EJ
MP26338 \dagger	FA9803-1	Chromium	11.6 %D	EJ
MP26338 \dagger	FA9803-1	Nickel	14.1 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Note –
 Ω – The samples associated with QC Batch MP26337 consist of JB51908-2 through -13, JB51908-16 through -19, and JB51908-21 through -23 (inclusive);
 \dagger – The samples associated with QC Batch MP26338 consist of JB51908-24, -25, JB51908-27 through -29, JB51908-32 through -34 (inclusive).

The associated chromium and nickel results in samples with laboratory sample ID numbers ranging JB51908-2 through -13, -16 through -19, -21 through -25, -27 through -29, and JB51908-32 through -34, inclusive, are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The vanadium results in samples JB51908-2 through -13, JB51908-16 through -19, and JB51908-21 through -23 (inclusive) are also subject to be flagged with “EJ”. The individual qualified sample results are presented in the summary table, Table 6, along with the results qualified for matrix spike recoveries below QC limits identified in Table 2 above.

Field Duplicate Sample Analysis (QC Limit $\leq 50\%$ RPD)

One set of field duplicate samples were collected from sampling location ED009 6-6.5 as part of SDG JB51908. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or $> 2 \times$ CRQL

(USEPA, 2012), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of this one pair of field duplicate samples are presented in Table 4, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar for all five analytes analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 32 %RPD or differed by less than two times the reporting limit value ($< 2 \times \text{CRQL}$) for all analyte pairs. Soil sample non-homogeneity may have contributed to any observed disparities.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB51908

Analyte	ED009 6-6.5 (mg/Kg)	DUP 04 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.0 NJ-	< 3.4 NJ-	< 2 × CRQL	-
Chromium	394 ENJ-	287 ENJ-	31.4 %	-
Nickel	36.7 EJ	36.9 EJ	0.5 %	-
Thallium	< 1.0	< 0.87	< 2 × CRQL	-
Vanadium	14.7 ENJ-	16.1 ENJ-	9.1 %	-
<p>< – The analyte was not detected at the stated reporting limit; J – The reported result is an estimated value; NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low; E – The serial dilution result is outside control limits; indeterminate bias direction; EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction; CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit; < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.</p>				

Consequently, the field duplicate results in this pair of field duplicate samples demonstrated very good sampling representativeness and precision, with results generally less than 10%RPD, except for the 31%RPD for chromium, which is still well within QC limits.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported vanadium results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times \text{TS}/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The vanadium concentration for Sample ED012 8.5-9 (JB51908-32) was listed as 102 mg/Kg on the reporting form and 2.291 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(2,291 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.28 \text{ g}) (87.8/100\%)} = 101.9274 \mu\text{g/g}$$

$$= 102 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 102 mg/Kg for Sample ED012 8.5-9 was correctly reported. Note that the software incorporates the dilution factor into the mg/L value in the raw data quant report, hence a dilution factor of only one (DF = 1) appears in the equation above, even though the dilution factor was 5x. The dilution factor appears as "Corr. Factor: 5.000" on the quant report.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 22 of the 27 soil samples that had been diluted by a factor of either two, five, or twenty.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where two samples were diluted by a factor of 20x and 5x, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 5, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 5. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
ED011 7-7.5	JB51908-28	Antimony	< 0.99	5	< 11 NJ-	6
ED012 9.5-10	JB51908-33	Antimony	< 3	20	< 60 NJ-	6
ED012 9.5-10	JB51908-33	Nickel	< 2.85	20	< 57 EJ	31
ED012 9.5-10	JB51908-33	Thallium	< 0.7	20	< 14	3

Units – mg/Kg

< - The analyte was analyzed for, but was not detected above the stated reporting limit.

NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

The interpretation of the antimony result in JB51908-28 (<11) was not compromised by the applied dilution, because the nickel concentration (38.7 mg/Kg) was above the SRS criterion of 31 mg/Kg and, thus, potentially subject to some sort of response action or further evaluation. However, although the elevated reporting limits for JB51908-33 are rather high, the associated Cr+6 concentration for this sample was very low (0.65 mg/Kg) and considerably below its SRS of 20 mg/Kg.

Metals Analysis Summary

The soil sample analytical results for the samples of SDG JB51908 were found to be compliant with the analytical methods for the analysis of metals in the twenty-seven soil samples and one field blank using SW-846 Method 6010C.

Several matrix spike recoveries in the QC samples were outside QC limits, such that the antimony results in all soil samples are qualified due to a potential low bias (NJ-), while the detected nickel and vanadium results are qualified as estimated values due to a potential low bias in the associated samples (flagged NJ-), as summarized in Table 2 and detailed in Table 6.

The serial dilution results for chromium, nickel and vanadium in the QC sample of QC Batch MP26337 were above the QC limit of 10.0 %D, suggesting potential variability in the reported results due to the presence of interference in the matrix. The identified chromium and nickel sample results are qualified as estimated values and are flagged with "EJ" in eight soil samples, as presented below in Table 6, as were the nickel results in 19 soil samples, while the chromium and vanadium results in the 19 soil samples are also flagged for the low matrix spike recoveries (thus, flagged with "ENJ-").

Table 6. Summary Qualified Sample Metals Results in SDG JB51908

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD004 5.5-6	JB51908-2	Antimony	< 1.1	NJ-
GD004 5.5-6	JB51908-2	Chromium	24.3	ENJ-
GD004 5.5-6	JB51908-2	Nickel	32.4	EJ
GD004 5.5-6	JB51908-2	Vanadium	11.7	ENJ-
GD004 6.5-7	JB51908-3	Antimony	< 1.8	NJ-
GD004 6.5-7	JB51908-3	Chromium	15.7	ENJ-
GD004 6.5-7	JB51908-3	Nickel	30.1	EJ
GD004 6.5-7	JB51908-3	Vanadium	15.5	ENJ-
GD004 7.5-8	JB51908-4	Antimony	< 2.2	NJ-
GD004 7.5-8	JB51908-4	Chromium	19.4	ENJ-
GD004 7.5-8	JB51908-4	Nickel	36.4	EJ
GD004 7.5-8	JB51908-4	Vanadium	19.4	ENJ-
GD002 0"-6"	JB51908-5	Antimony	< 1.2	NJ-
GD002 0"-6"	JB51908-5	Chromium	14.0	ENJ-
GD002 0"-6"	JB51908-5	Nickel	19.9	EJ
GD002 0"-6"	JB51908-5	Vanadium	59.1	ENJ-
GD002 2-2.5	JB51908-6	Antimony	< 1.6	NJ-
GD002 2-2.5	JB51908-6	Chromium	41.2	ENJ-
GD002 2-2.5	JB51908-6	Nickel	19.5	EJ
GD002 2-2.5	JB51908-6	Vanadium	43.9	ENJ-
GD002 4-4.5	JB51908-7	Antimony	< 2.1	NJ-
GD002 4-4.5	JB51908-7	Chromium	17.7	ENJ-
GD002 4-4.5	JB51908-7	Nickel	38.2	EJ
GD002 4-4.5	JB51908-7	Vanadium	17.3	ENJ-
GD002 6-6.5	JB51908-8	Antimony	< 2.0	NJ-
GD002 6-6.5	JB51908-8	Chromium	21.7	ENJ-
GD002 6-6.5	JB51908-8	Nickel	32.0	EJ
GD002 6-6.5	JB51908-8	Vanadium	16.7	ENJ-
GD002 8-8.5	JB51908-9	Antimony	< 2.0	NJ-
GD002 8-8.5	JB51908-9	Chromium	17.3	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD002 8-8.5	JB51908-9	Nickel	56.9	EJ
GD002 8-8.5	JB51908-9	Vanadium	17.1	ENJ-
GD003 5-5.5	JB51908-10	Antimony	< 2.1	NJ-
GD003 5-5.5	JB51908-10	Chromium	23.7	ENJ-
GD003 5-5.5	JB51908-10	Nickel	84.2	EJ
GD003 5-5.5	JB51908-10	Vanadium	18.5	ENJ-
GD003 6-6.5	JB51908-11	Antimony	< 1.9	NJ-
GD003 6-6.5	JB51908-11	Chromium	14.0	ENJ-
GD003 6-6.5	JB51908-11	Nickel	37.3	EJ
GD003 6-6.5	JB51908-11	Vanadium	15.5	ENJ-
GD003 7-7.5	JB51908-12	Antimony	< 2.5	NJ-
GD003 7-7.5	JB51908-12	Chromium	15.5	ENJ-
GD003 7-7.5	JB51908-12	Nickel	51.3	EJ
GD003 7-7.5	JB51908-12	Vanadium	16.8	ENJ-
GD003 8-8.5	JB51908-13	Antimony	< 2.2	NJ-
GD003 8-8.5	JB51908-13	Chromium	18.1	ENJ-
GD003 8-8.5	JB51908-13	Nickel	34.1	EJ
GD003 8-8.5	JB51908-13	Vanadium	18.9	ENJ-
FD002 4.5-5	JB51908-16	Antimony	< 2.1	NJ-
FD002 4.5-5	JB51908-16	Chromium	38.8	ENJ-
FD002 4.5-5	JB51908-16	Nickel	39.1	EJ
FD002 4.5-5	JB51908-16	Vanadium	16.0	ENJ-
FD002 5.5-6	JB51908-17	Antimony	< 1.9	NJ-
FD002 5.5-6	JB51908-17	Chromium	21.9	ENJ-
FD002 5.5-6	JB51908-17	Nickel	35.2	EJ
FD002 5.5-6	JB51908-17	Vanadium	16.5	ENJ-
FD002 6.5-7	JB51908-18	Antimony	< 1.8	NJ-
FD002 6.5-7	JB51908-18	Chromium	27.3	ENJ-
FD002 6.5-7	JB51908-18	Nickel	30.5	EJ
FD002 6.5-7	JB51908-18	Vanadium	17.1	ENJ-
FD002 7.5-8	JB51908-19	Antimony	< 2.2	NJ-
FD002 7.5-8	JB51908-19	Chromium	15.8	ENJ-
FD002 7.5-8	JB51908-19	Nickel	31.9	EJ
FD002 7.5-8	JB51908-19	Vanadium	16.7	ENJ-
ED009 5-5.5	JB51908-21	Antimony	< 3.8	NJ-
ED009 5-5.5	JB51908-21	Chromium	566	ENJ-
ED009 5-5.5	JB51908-21	Nickel	35.3	EJ
ED009 5-5.5	JB51908-21	Vanadium	18.3	ENJ-
DUP 04	JB51908-22	Antimony	< 3.4	NJ-
DUP 04	JB51908-22	Chromium	287	ENJ-
DUP 04	JB51908-22	Nickel	36.9	EJ
DUP 04	JB51908-22	Vanadium	16.1	ENJ-
ED009 6-6.5	JB51908-23	Antimony	< 4.0	NJ-
ED009 6-6.5	JB51908-23	Chromium	394	ENJ-
ED009 6-6.5	JB51908-23	Nickel	36.7	EJ
ED009 6-6.5	JB51908-23	Vanadium	14.7	ENJ-
ED009 7-7.5	JB51908-24	Antimony	< 1.9	NJ-
ED009 7-7.5	JB51908-24	Chromium	201	EJ
ED009 7-7.5	JB51908-24	Nickel	32.6	EJ
ED009 8-8.5	JB51908-25	Antimony	< 1.8	NJ-
ED009 8-8.5	JB51908-25	Chromium	15.2	EJ
ED009 8-8.5	JB51908-25	Nickel	28.9	EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED011 6-6.5	JB51908-27	Antimony	< 2.0	NJ-
ED011 6-6.5	JB51908-27	Chromium	297	EJ
ED011 6-6.5	JB51908-27	Nickel	26.7	EJ
ED011 7-7.5	JB51908-28	Antimony	< 11	NJ-
ED011 7-7.5	JB51908-28	Chromium	1340	EJ
ED011 7-7.5	JB51908-28	Nickel	38.7	EJ
ED011 8-8.5	JB51908-29	Antimony	2.1	NJ-
ED011 8-8.5	JB51908-29	Chromium	83.2	EJ
ED011 8-8.5	JB51908-29	Nickel	22.6	EJ
ED012 8.5-9	JB51908-32	Antimony	< 4.4	NJ-
ED012 8.5-9	JB51908-32	Chromium	666	EJ
ED012 8.5-9	JB51908-32	Nickel	64.3	EJ
ED012 9.5-10	JB51908-33	Antimony	< 60	NJ-
ED012 9.5-10	JB51908-33	Chromium	8550	EJ
ED012 9.5-10	JB51908-33	Nickel	< 57	EJ
ED012 10.5-11	JB51908-34	Antimony	< 1.3	NJ-
ED012 10.5-11	JB51908-34	Chromium	454	EJ
ED012 10.5-11	JB51908-34	Nickel	25.3	EJ

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

J – The reported result is an estimated value;

NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;

E – The serial dilution result is outside control limits; indeterminate bias direction;

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one QC batch for Field Blank sample.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|---------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ Quantitation checks | Field duplicate sample analysis |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in 17 of 27 soil samples analyzed in SDG JB51908. Cr⁺⁶ results had exceeded the SRS of 20 mg/Kg in two (2) soil samples.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.9998, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 91.6% to 99.9% for the two QC batches associated with the 27 soil samples and one Field Blank, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg or 0.010 mg/L), any of the continuing calibration blanks (< 0.010 mg/L), or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 7. No hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 7. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75830	JB51908-19	Cr ⁺⁶ , soluble	84.7 %	----	----
GP75830	JB51908-19	Cr ⁺⁶ , insoluble	91.5 %	----	----
GP75831	JB51908-3	Cr ⁺⁶ , soluble	88.0 %	----	----
GP75831	JB51908-3	Cr ⁺⁶ , insoluble	86.7 %	----	----
GN94299	JB51824-1	Cr ⁺⁶ , soluble	93.3 %	----	----

QC Limits are 75-125% (soil) and 85-115% (aqueous) for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium

Duplicate Sample Analysis

In soil, the 20.8%RPD result for the duplicate Cr⁺⁶ analyses was the highest result observed in the general chemistry set of duplicate analyses. This %RPD value was slightly above the laboratory QC limits of 20%RPD, and below the recommended 35%RPD QC limit for soil samples (USEPA, 2010). However, this %RPD value is also acceptable due to low duplicate and sample concentrations. In the aqueous matrix, the 200%RPD was outside the QC limit of 20% RPD. However, this %RPD value is acceptable due to low duplicate and sample concentrations; the difference was less than the reporting limit. All other duplicate analyses met QC requirements including Cr⁺⁶, redox potential and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

In soil and aqueous batches, the recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 85.6% to 103.4%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in any of the three analytical sequences. The serial dilution analysis is not a requirement of the analytical method.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The results for the analysis of the one pair of field duplicate samples from sampling location ED009 6-6.5 are presented in Table 8, below.

Table 8. Comparison of Field Duplicate Soil Sample Results – SDG JB51908

Analyte	ED009 6-6.5 (mg/Kg)	DUP 04 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	6.4	13.6	72.0 %	J
QC Limit is ≤ 50 %RPD; J – The reported result is an estimated value;				

It is apparent that the results for the hexavalent chromium concentrations in the field duplicate samples from location ED009 6-6.5 are disparate and, thus, subject to qualification.

As a result of the disparity in the respective hexavalent chromium results for the field duplicate samples from ED009 6-6.5, these results are subject to qualification and are to be flagged with "J", as indicated in Table 8 above. Even with the observed disparity, which may be attributable to soil sample non-homogeneity, the results were both clearly below the SRS of 20 mg/Kg facilitating the use of these results in project evaluations.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calibration curve (mg/L)
B = Final digested volume (L)
C = Wet wt of sample (Kg)
D = % Solids/100
E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ED011 6-6.5 (JB51908-27) was listed as 35.9 mg/Kg on the reporting form and 0.7302 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.7302 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00253 \text{ Kg} \times 80.5/100} = \frac{0.07302}{0.0020367} = 35.8530 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 35.9 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 35.9 mg/Kg for Sample ED011 6-6.5 was correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 27 soil samples of this SDG, JB51908. Thus, this detected Cr⁺⁶ concentration was above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

Most samples were observed to fall below the Eh-pH phase diagram line. These results suggest that many of the samples experience conditions of a "reducing" soil environment. Some of the samples (2 out of 27) fall on or slightly above the Eh-pH phase diagram line. These results suggest that some of the samples may experience condition of an oxidizing soil environment. However, the reported Cr⁺⁶ results of the affected samples are considered acceptable because of two issues, one being that the Cr⁺⁶ concentration of the samples in the oxidizing environment are below the SRS (20 mg/Kg). The Cr+6 results of the other samples in the reducing soil are not expected to increase in value because oxidation to Cr⁺⁶ is not favorable under reducing soil conditions. Thus, the hexavalent chromium results are considered acceptable as reported, with the highest hexavalent chromium concentration (35.9 mg/Kg) detected in two different samples above the SRS of 20 mg/Kg, as detailed in the text above, with both samples situated below the Eh-pH line in "reducing" conditions. The detected Cr+6 concentrations of the remaining samples were all below 13.6 mg/Kg.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were within QC limits, as were all other QC results associated with the hexavalent chromium analysis, including the duplicate sample analysis, no Cr⁺⁶ results were qualified following the DV review, except for the two Cr+6 results in the field duplicate samples from location ED009 6-6.5, which are estimated values flagged with "J", as presented below in Table 9.

Table 9. Summary of Qualified Sample Cr⁺⁶ Results in SDG JB51908

Client ID	Laboratory Sample ID	Analyte	Result (mg/Kg)	DV Qualifier
DUP 04	JB51908-22	Cr+6	13.6	J
ED009 6-6.5	JB51908-23	Cr+6	6.4	J
< – The analyte was analyzed for, but not detected at the specified reporting limit. J – The reported result is an estimated value (due to field duplicate sample analysis disparity). The reported sample value is estimated with an indeterminate bias direction.				

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

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New Jersey Department of Environmental Protection, 2001, *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

US EPA, CLP, 2010, *"National Functional Guidelines for Inorganic Superfund Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB51908

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? *for metals analysis* Yes No
Indicate the identity of the samples and why. *Matrix interference.*

(2x) JB51908-3, 4, 6-13; 16-19; 21-25.

(5x) JB51908-28, 32

(20x) JB51908-33

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No

If "Yes", list the affected samples.

JB51908-28 (antimony)

JB51908-33 (antimony, nickel, thallium)

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

18 nickel: JB51908-2, 4, 7, 8, 9, 10, 11, 12, 13, 16, 17,

1 vanadium: JB51908-32, 19, 21, 22, 23, 24, 28, 32.

2 Cr+6: JB51908-32

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No problems with analytical procedures were noted.

JB51908

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3 and 8 for details.

Qualified sample results are presented in tables 6 and 9 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB52025/JB52025R/JB52025T
Sample Date: November 4, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
SPLP Leachate Analysis, EPA Method 1312
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: January 29, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-eight (28) soil samples and one (1) field blank (FB) samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 4, 2013 for sample delivery group (SDG) JB52025, JB52025R and JB52025T. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB52025 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 28 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB52025-1, JB52025-3 through-7, JB52025-9 through -12, JB52025-14 through -19, JB52025-21 through -24, (inclusive) and JB542025-27;
- Antimony (*NJ-) in Samples JB52025-28 through-32 (inclusive), JB52025-26A;
- Chromium (EJ) and nickel (EJ) in Samples JB52025-1, and JB52025-3 through -5 (inclusive);
- Chromium (ENJ-) in Samples JB52025-28 through -32 (inclusive), JB52025-25A and -26A;
- Nickel (EJ) in Samples JB52025-28 through -32 (inclusive), JB52025-25A;
- Vanadium (EJ) in Samples JB52025-6 and -7, JB52025-9 through -12, JB52025-14 through -19, JB52025-21 through -24, JB52025-27 through -32 (inclusive);
- Nickel (EJ) in the reanalysis of Sample JB52025-19R;
- Antimony (NJ-) in the reanalysis of Sample JB52025-19T;

- Vanadium (EJ) in the reanalysis of Sample JB52025-19T.

No other sample results in SDG JB52025 required qualification. Details are provided in the tables and text below. The sample results that were subject to qualification following the DV review are presented in Tables 7, 10 and 11 of this DV report.

The reported concentrations were below the respective site remediation standard (SRS) limits, except for thirteen nickel results, three vanadium results, one antimony result, and one thallium result. There were seven hexavalent chromium (Cr+6) results above its SRS of 20 mg/Kg. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-eight (28) soil samples and one field blank collected November 4, 2013, were received the same day at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 3.8°C. The samples destined for metals and SPLP leachate analyses were received at the Accutest Laboratories Southeast, Inc. in Orlando, Florida November 7, 2013 preserved and in good condition with sampling cooler temperatures of 3.4°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary for SDG JB52025

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
DUP 06	JB52025-1	11/4/13	Soil	Metals, Cr+6
GD014 6-6.5	JB52025-3	11/4/13	Soil	Metals, Cr+6
GD014 7-7.5	JB52025-4	11/4/13	Soil	Metals, Cr+6
GD014 8-8.5	JB52025-5	11/4/13	Soil	Metals, Cr+6
GD014 9-9.5	JB52025-6	11/4/13	Soil	Metals, Cr+6
DUP 07	JB52025-7	11/4/13	Soil	Metals, Cr+6
GD013 7-7.5	JB52025-9	11/4/13	Soil	Metals, Cr+6
GD013 8-8.5	JB52025-10	11/4/13	Soil	Metals, Cr+6
GD013 9-9.5	JB52025-11	11/4/13	Soil	Metals, Cr+6
GD013 10-10.5	JB52025-12	11/4/13	Soil	Metals, Cr+6
GD015 0"-6"	JB52025-14	11/4/13	Soil	Metals, Cr+6
GD015 6.5-7	JB52025-15	11/4/13	Soil	Metals, Cr+6
GD015 7.5-8	JB52025-16	11/4/13	Soil	Metals, Cr+6
GD015 8.5-9	JB52025-17	11/4/13	Soil	Metals, Cr+6
GD015 9.5-10	JB52025-18	11/4/13	Soil	Metals, Cr+6
107_1044 11.5-12	JB52025-19	11/4/13	Soil	Metals, Cr+6
FB 05	JB52025-20	11/4/13	FB Soil	Metals, Cr+6
ID009 6.5-7	JB52025-21	11/4/13	Soil	Metals, Cr+6
ID009 7.5-8	JB52025-22	11/4/13	Soil	Metals, Cr+6
ID009 8.5-9	JB52025-23	11/4/13	Soil	Metals, Cr+6
ID009 9.5-10	JB52025-24	11/4/13	Soil	Metals, Cr+6
ID009 7-7.5	JB52025-25	11/4/13	Soil	SPLP Leachate Ni
ID009 7-7.5	JB52025-25A	11/4/13	Soil	Ni
ID009 12-12.5	JB52025-26	11/4/13	Soil	SPLP Leachate Sb
ID009 12-12.5	JB52025-26A	11/4/13	Soil	Sb
ID009 0"-6"	JB52025-27	11/4/13	Soil	Metals, Cr+6
GD012 0"-6"	JB52025-28	11/4/13	Soil	Metals, Cr+6
GD012 6.5-7	JB52025-29	11/4/13	Soil	Metals, Cr+6

GD012 7.5-8	JB52025-30	11/4/13	Soil	Metals, Cr+6
GD012 8.5-9	JB52025-31	11/4/13	Soil	Metals, Cr+6
GD012 9.5-10	JB52025-32	11/4/13	Soil	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories in Dayton, NJ. (Ni = nickel, Sb = antimony)				
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

The sample with laboratory sample ID number JB52025-19 was incorrectly logged into the laboratory data system as 107_I044 11.2-12. However, the correct client sample number should be, as noted on the chain of custody (COC) forms, 107_I044 11.5-12. The client ID listed on the COC will be used in this DV report to represent this sample.

Data Review

Data, as presented in the analytical data package SDG JB52025, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (✓) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Two soil samples were analyzed for SPLP leachate analysis, one nickel and one antimony analysis, along with the following parameters: weight, dry weight, volume, and pH. Several soil sample results exhibited concentrations above the respective site remediation standard (SRS) in some of the 28 soil samples of this SDG. These included thirteen (13) nickel, three vanadium, one antimony result and one thallium result above the respective SRS values of 31, 78, 6 and 3 mg/Kg, respectively.

Laboratory Case Narrative

The extensive case narrative identified all analytes for the samples that were diluted, listing them individually by analyte in random fashion. Matrix spike and MSD recoveries for antimony were identified as being outside QC limits in QC batches MP26338, MP26344, and MP26347, along with the chromium result being outside QC limits in QC Batch MP26344. The duplicate matrix spike recoveries for antimony were outside QC limits in MP26344. The serial dilution results were outside QC limits for antimony, chromium and nickel in MP26338, chromium, nickel, thallium and vanadium in MP262344, and antimony, chromium, nickel and vanadium in MP26347, but, according to the case narrative, the percent differences were acceptable due to low initial sample concentrations ($< 50 \times \text{IDL}$). This apparently was not always correct, as discussed below. All other QC requirements were met, including analyses for pH, oxidation reduction potential, total solids, and the leachate analyses. Details are discussed in the sections below. The metals analyses were performed at the Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard (IS) area counts identified below.

There were several samples whose IS area counts were above the QC limits of 60-125% identified in the data package for Run number MA11205. Internal standard #2 (IS#2) is associated with chromium and vanadium, while IS#1 is associated with antimony. IS#2 (Cr and V) was out for samples JB52025 -9, -16, -17, -21, -23, while IS#1 (Sb) and #2 (Cr, V) were out for JB512025-12. Samples -9 and -16 were re-analyzed at a dilution that had acceptable IS recoveries. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Applying these revised QC limits, the IS recoveries for samples JB52025-17 and -23 and the IS#1 result for -12 are thereby considered acceptable and did not warrant re-analysis. The vanadium results for samples JB52025-12 and -21 are qualified as estimated values and flagged with "EJ"

due to the serial dilution analysis, leaving only the chromium results for these two samples in question. However, considering that there is no requirement for assessing IS results in Method 6010C (USEPA, 1997) with no DV guidance (NJDEP, 2002) and, the fact that the chromium concentrations in these two samples are orders of magnitude less than the chromium SRS of 120,000 mg/Kg, professional judgement was applied in not qualifying the chromium results in these two remaining samples.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB52025.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for QC samples in the three identified QC batches associated with the soil samples which are summarized in Table 2 below. The chromium MSD recovery in QC Batch MP26344 was also below QC limits, as presented below in Table 2. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the antimony sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential low bias in the ability to recover these affected analytes in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The chromium results associated with QC Batch MP26344 were also qualified as estimated values and flagged with "NJ-" due to a potential low bias. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26338 Ω	FA9803-1	Antimony	57.4 %	52.0 %	NJ-	Low
MP26344 †	JB52031-1	Antimony	53.1 %	47.0 %	NJ-	Low
MP26344 †	JB52031-1	Chromium	89.9 %	60.1 %	NJ-	Low
MP26347 #	FA9959-1	Antimony	73.6 %	74.4 %	NJ-	Low

QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate.
 Ω – The samples associated with QC Batch MP26338 consist of JB52025-1, -3, -4, and -5;
 † – The samples associated with QC Batch MP26344 consist of JB52025-28 through -32 (inclusive), JB52025-25A, and JB52025-26A;
 # – The samples associated with QC Batch MP26347 consist of JB52025-6, JB52025-7, JB52025-9 through -12, JB52025-14 through -19, JB52025-21 through -24, and JB52025-27.

The antimony results in all of these affected samples are flagged with "NJ-" due to a potential low bias, while the chromium results flagged with "NJ-" in those samples associated with QC Batch MP26344. These qualified results are presented below in summary table, Table 7, together with the results qualified for the spiked duplicate and serial dilution analyses results.

A possible explanation for the low spike recoveries of antimony in each of the three soil sample batches may be due to problems with the procedure, as it has been noted in the literature that the use of USEPA Methods 3020 and 3050 may be inappropriate for the effective analysis of some metals, including antimony and chromium (Smith, 1999).

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on three samples analyzed in duplicate, and three pairs of spiked duplicate samples as a means of assessing the analytical precision.

The case narrative stated that the RPD(s) for MSD for antimony, chromium, nickel, thallium, and vanadium were outside QC limits in QC Batch MP26344 due to possible sample non-homogeneity. However, all %RPD values for the spiked duplicate sample pairs were below the DV guideline of 35%RPD, except for antimony (36.4%RPD), as presented below in Table 3. All remaining duplicate and spiked duplicate results were below the applied QC limit of 35%RPD or < 2 ×CRQL (USEPA, 2010). Thus, the antimony results associated with QC Batch MP26344 are qualified as estimated values and are to be flagged with "*J" due to the potential variability in the analytical precision, though without exhibiting any clear bias direction. When the "*J" qualifiers are combined with the qualifiers associated with the low antimony MS/MSD recoveries in the QC sample of this batch, the antimony results appear with "*NJ-" in the summary table, Table 7.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
MP26344 †	JB52031-1	Antimony	36.4 %RPD	*J
QC Limit is 35%RPD; * – Duplicate analysis not within control limits; indeterminate bias direction. J – The reported result is an estimated value. † – The samples associated with QC Batch MP26344 consist of JB52025-28 through -32 (inclusive), JB52025-25A, and JB52025-26A;				

Aside from the antimony results in QC Batch MP26344, the remaining duplicate analyses demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 98.1% - 107.0% for the soil sample metals analysis, 94.5% to 101.8% for the aqueous batch and 92-100% for the leachate analyses.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The serial dilution results were outside QC limits for chromium and nickel in MP26338, chromium, nickel and vanadium in MP262344, and vanadium in MP26347 where the differences were probably due to sample non-homogeneity. These results are summarized below in Table 4.

Table 4. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26338 Ω	FA9803-1	Chromium	11.6 %D	EJ
MP26338 Ω	FA9803-1	Nickel	14.1 %D	EJ
MP26344 †	JB5203-1	Chromium	17.1 %D	EJ
MP26344 †	JB5203-1	Nickel	42.7 %D	EJ
MP26344 †	JB5203-1	Vanadium	38.9 %D	EJ
MP26347 #	FA9959-1	Vanadium	13.9 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26338 consist of JB52025-1, -3, -4, and -5;
† – The samples associated with QC Batch MP26344 consist of JB52025-28 through -32 (inclusive), JB52025-25A, and JB52025-26A;
– The samples associated with QC Batch MP26347 consist of JB52025-6, JB52025-7, JB52025-9 through -12, JB52025-14 through -19, JB52025-21 through -24, and JB52025-27.

The case narrative had stated that the RPD for antimony, chromium and nickel were outside QC limits in QC Batch MP26338, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, inspection of the data revealed that this statement applied only to antimony, because the initial concentrations of chromium and nickel in the QC sample were, in fact, above the 50 × IDL criterion. Consequently, the chromium and nickel results in the associated samples of QC Batch MP26338 were qualified as estimated values and flagged with “EJ”, as presented below in the summary table, Table 7. Although the case narrative stated that chromium, nickel, thallium and vanadium in MP262344, and antimony, chromium, nickel and vanadium in MP26347 were acceptable due to low initial concentrations, actual data review revealed that the following analytes were actually subject to qualification following the DV review. The chromium, nickel and vanadium samples associated with QC Batch MP26344, and the vanadium results in samples associated with QC Batch MP26347 were also flagged with “EJ”. Because the chromium MSD recovery in MP26344 was below QC limits, the chromium results associated with this QC batch are actually flagged with “ENJ-” in combining both qualifications in order to avoid redundancy in Table 7.

The results qualified for serial dilution results are qualified as estimated values due to potential variability affected by the presence of some type of matrix interference, without any determinate bias direction.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

Two sets of field duplicate samples were collected as part of SDG JB52025. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2010), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the two pairs of field duplicate samples are presented in Table 5, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar in one of the two pairs of samples analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 22 %RPD or differed by less than two times the reporting limit value ($< 2 \times \text{CRQL}$) for all analyte pairs, except for the nickel and vanadium results for the field duplicates from GD012 0"-6". Soil sample non-homogeneity may have contributed somewhat to the observed disparities, as well as the serial dilution results for nickel. The difference between the vanadium results in this sample pair (51.4%RPD) is just marginally above the QC limit of 50%RPD.

Table 5. Comparison of Field Duplicate Soil Sample Results – SDG JB52025

Analyte	GD012 0"-6" (mg/Kg)	DUP 06 (mg/Kg)	% RPD	DV Flag
Antimony	< 0.90 *NJ-	< 0.76 NJ-	< 2 × CRQL	-
Chromium	9.7 ENJ-	7.8 EJ	21.7 %	-
Nickel	12.2 EJ	27.4 EJ	76.8 %	(J)
Thallium	< 0.45	< 3.8	< 2 × CRQL	-
Vanadium	22.1 EJ	37.4	51.4 %	J
Analyte	GD014 9-9.5 (mg/Kg)	DUP 07 (mg/Kg)	% RPD	DV Flag
Antimony	< 1.2 NJ-	< 0.99 NJ-	< 2 × CRQL	-
Chromium	5.1	6.1	17.8 %	-
Nickel	13.3	12.3	7.8 %	-
Thallium	< 0.62	< 0.50	< 2 × CRQL	-
Vanadium	10.6 EJ	8.7 EJ	19.7 %	-

< – The analyte was not detected at the stated reporting limit.
 J – The reported result is an estimated value.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
 *J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction.
 EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
 (J) – Sample result is subject to DV qualification, but not additionally flagged with "J" to avoid redundancy of qualifiers.
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit.
 $< 2 \times \text{CRQL}$ – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

Consequently, due to the disparity in the respective detected nickel and vanadium results for the field duplicate samples from GD012 0"-6", these results are to be qualified and flagged with "J", as indicated in Table 5 above. However, the nickel results from the field duplicates of GD012 0"-6" are already qualified and flagged with "EJ", as is the vanadium result for this sample. Consequently, these three results were not further flagged with "J" in an effort to avoid redundancy in the applied qualifiers, thereby leaving only the vanadium result in DUP 06 as having a result qualified for field duplicate results issues. Otherwise, the field duplicate results in the pairs of field duplicate samples demonstrated acceptable sampling representativeness and precision, with results generally less than 22%RPD. The qualified sample results are presented in the summary table, Table 7.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The vanadium concentration for Sample GD015 0"-6" (JB52025-14) was listed as 141 mg/Kg on the reporting form and 4.254 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Vanadium (mg/Kg)} &= \frac{(4,254 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.60 \text{ g})(94.2/100\%)} = \frac{212,700}{1,507.2} = 141.1226 \mu\text{g/g} \\ &= 141 \text{ mg/Kg, dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 141 mg/Kg for Sample GD015 0"-6" was correctly reported. Note that the software incorporates the dilution factor into the mg/L value in the raw data quant report, hence a dilution factor of only one (DF = 1) appears in the equation above, even though the dilution factor was 5x. The dilution factor appears as "Corr. Factor: 5.000" on the quant report. This was the highest vanadium concentration of the samples in this SDG, a value above the SRS of 31 mg/Kg.

Reporting Limits

The case narrative did identify that there were many samples that were diluted. There were actually 13 samples that underwent a dilution, five samples were diluted by a factor of five (5x), four were diluted by a factor of ten (10x), two that were diluted by a factor of four (4x), and two that were diluted by a factor of two (2x).

The affected samples with the adjusted reporting limits above the respective SRS values are presented below in Table 6. While the reporting limits for antimony, chromium, nickel, thallium and vanadium became elevated upon dilution, only those antimony and thallium reporting limits tabulated below were observed to fall above the respective SRS values. Even though there were four samples diluted by a factor of 10x, and five by a factor of 5x, only these five samples experienced raised reporting limits above the SRS values, partly because the total solids contents were low, three being approximately 70% or less.

Table 6. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit	Dilution Factor	Adjusted Result (mg/Kg)	Remediation Standard
GD013 7-7.5	JB52025-9	Antimony	< 1.3	10	< 13	6
GD013 7-7.5	JB52025-9	Thallium	< 0.63	10	< 6.3	3

GD015 0"-6"	JB52025-14	Antimony	< 0.66	10	< 6.6	6
GD015 0"-6"	JB52025-14	Thallium	< 0.33	10	< 3.3	3
GD015 7.5-8	JB52025-16	Thallium	< 0.56	10	< 5.6	3
GD012 7.5-8	JB52025-30	Antimony	< 1.42	5	< 7.1	6
GD012 7.5-8	JB52025-30	Thallium	< 0.7	5	< 3.5	3
GD012 8.5-9	JB52025-31	Antimony	< 1.4	10	< 14	6
GD012 8.5-9	JB52025-31	Thallium	< 0.69	10	< 6.9	3
Units – mg/Kg						
< - The analyte was analyzed for, but was not detected above the stated reporting limit.						

Although some samples were diluted up to a dilution factor of 10, only the reporting levels of these five samples exceeded the respective SRS values for antimony and thallium, as presented above in Table 6, due partly to the magnitude of the dilution factor and partly due to the low percent solids found in a sample which effected a raising of the reporting limit above the two SRS values. The reporting limits of (non-detect) analytes in other samples, irrespective of the applied dilution, were all below the respective SRS values in the remaining soil samples of SDG JB52025. These elevated reporting limits did not compromise the evaluation of the sample results, because each of these affected samples exhibited at least one concentration of an analyte above the respective SRS, except JB52025-31, thereby diminishing the effect or influence of the raised reporting limits observed in Table 6.

Summary of Metals Analysis

The soil sample analytical results for the samples of SDG JB52025 were found to be compliant with the analytical methods for the analysis of metals in the fifty-one soil samples using SW-846 Method 6010C.

The QC criteria were met for the metals target analyte analyses, except for the following issues. Antimony experienced low MS and MSD recoveries in the three QC batches associated with 28 samples: JB52025-1, JB52025-3 through -7, JB52025-9 through -12, JB52025-14 through -19, and JB52025-21 through -24, JB52035-5A, JB52025-26A, and JB52025-27 through -32 (inclusive). The chromium spike recoveries were below QC limits in the MSD sample associated with 5 samples, JB52025-28 through -32 (inclusive), as presented below in Table 7. These recoveries for antimony and chromium in the associated samples indicate possible matrix interference and/or possible sample non-homogeneity. The antimony and chromium results in these samples are qualified as estimated values (flagged "NJ-") in the associated soil samples due to a potential low bias in the ability to recover these analytes in the given sample matrices. The chromium, nickel and vanadium in the samples listed in Table 7 are qualified as estimated values and flagged with "EJ" due to a potential variability in the reported results due to the presence of interference in the sample matrix.

Field duplicate sample results subject to qualification and flagged with "J" included only the nickel result in DUP 06. The vanadium result in GD012 0"-6" and the chromium results in GD012 0"-6" and DUP 06 were not additionally flagged with "J", because the results are already qualified as estimated values and are flagged with "EJ" in these samples due to the potential variability in the analytical precision or sample non-homogeneity.

Table 7. Summary Qualified Sample Metals Results in SDG JB52025

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DUP 06	JB52025-1	Antimony	< 0.76	NJ-
DUP 06	JB52025-1	Chromium	7.8	EJ
DUP 06	JB52025-1	Nickel	27.4	EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DUP 06	JB52025-1	Vanadium	37.4	J
GD014 6-6.5	JB52025-3	Antimony	< 0.90	NJ-
GD014 6-6.5	JB52025-3	Chromium	87.0	EJ
GD014 6-6.5	JB52025-3	Nickel	7.5	EJ
GD014 7-7.5	JB52025-4	Antimony	1.1	NJ-
GD014 7-7.5	JB52025-4	Chromium	25.7	EJ
GD014 7-7.5	JB52025-4	Nickel	23.1	EJ
GD014 8-8.5	JB52025-5	Antimony	1.2	NJ-
GD014 8-8.5	JB52025-5	Chromium	15.1	EJ
GD014 8-8.5	JB52025-5	Nickel	46.6	EJ
GD014 9-9.5	JB52025-6	Antimony	< 1.2	NJ-
GD014 9-9.5	JB52025-6	Vanadium	10.6	EJ
DUP 07	JB52025-7	Antimony	< 0.99	NJ-
DUP 07	JB52025-7	Vanadium	8.7	EJ
GD013 7-7.5	JB52025-9	Antimony	< 13	NJ-
GD013 7-7.5	JB52025-9	Vanadium	90.6	EJ
GD013 8-8.5	JB52025-10	Antimony	< 2.3	NJ-
GD013 8-8.5	JB52025-10	Vanadium	35.0	EJ
GD013 9-9.5	JB52025-11	Antimony	< 1.9	NJ-
GD013 9-9.5	JB52025-11	Vanadium	69.3	EJ
GD013 10-10.5	JB52025-12	Antimony	< 1.1	NJ-
GD013 10-10.5	JB52025-12	Vanadium	15.8	EJ
GD015 0-6"	JB52025-14	Antimony	< 6.6	NJ-
GD015 0-6"	JB52025-14	Vanadium	141	EJ
GD015 6.5-7	JB52025-15	Antimony	< 3.5	NJ-
GD015 6.5-7	JB52025-15	Vanadium	57.1	EJ
GD015 7.5-8	JB52025-16	Antimony	67.6	NJ-
GD015 7.5-8	JB52025-16	Vanadium	50.2	EJ
GD015 8.5-9	JB52025-17	Antimony	< 1.2	NJ-
GD015 8.5-9	JB52025-17	Vanadium	14.6	EJ
GD015 9.5-10	JB52025-18	Antimony	< 1.1	NJ-
GD015 9.5-10	JB52025-18	Vanadium	23.8	EJ
107_I044 11.5-12	JB52025-19	Antimony	< 5.2	NJ-
107_I044 11.5-12	JB52025-19	Nickel	2710 (E)	EJ
107_I044 11.5-12	JB52025-19	Vanadium	30.8	EJ
ID009 6.5-7	JB52025-21	Antimony	< 1.0	NJ-
ID009 6.5-7	JB52025-21	Vanadium	12.9	EJ
ID009 7.5-8	JB52025-22	Antimony	< 4.3	NJ-
ID009 7.5-8	JB52025-22	Vanadium	15.2	EJ
ID009 8.5-9	JB52025-23	Antimony	< 0.91	NJ-
ID009 8.5-9	JB52025-23	Vanadium	10.4	EJ
ID009 9.5-10	JB52025-24	Antimony	< 4.3	NJ-
ID009 9.5-10	JB52025-24	Vanadium I	31.1	EJ
ID009 7-7.5	JB52025-25A	Nickel	29.9	EJ
ID009 12-12.5	JB52025-26A	Antimony	2.1	*NJ-
ID009 0"-6"	JB52025-27	Antimony	2.3	NJ-
ID009 0"-6"	JB52025-27	Vanadium	43.1	EJ
GD012 0"-6"	JB52025-28	Antimony	< 0.90	*NJ-
GD012 0"-6"	JB52025-28	Chromium	9.7	ENJ-
GD012 0"-6"	JB52025-28	Nickel	12.2	EJ
GD012 0"-6"	JB52025-28	Vanadium	22.1	EJ
GD012 6.5-7	JB52025-29	Antimony	< 4.7	*NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GD012 6.5-7	JB52025-29	Chromium	216	ENJ-
GD012 6.5-7	JB52025-29	Nickel	12.3	EJ
GD012 6.5-7	JB52025-29	Vanadium	21.9	EJ
GD012 7.5-8	JB52025-30	Antimony	< 7.1	*NJ-
GD012 7.5-8	JB52025-30	Chromium	526	ENJ-
GD012 7.5-8	JB52025-30	Nickel	82.4	EJ
GD012 7.5-8	JB52025-30	Vanadium	137	EJ
GD012 8.5-9	JB52025-31	Antimony	< 14	*NJ-
GD012 8.5-9	JB52025-31	Chromium	966	ENJ-
GD012 8.5-9	JB52025-31	Nickel	18.8	EJ
GD012 8.5-9	JB52025-31	Vanadium	< 35	EJ
GD012 9.5-10	JB52025-32	Antimony	2.1	*NJ-
GD012 9.5-10	JB52025-32	Chromium	127	ENJ-
GD012 9.5-10	JB52025-32	Nickel	47.1	EJ
GD012 9.5-10	JB52025-32	Vanadium	30.3	EJ

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.
high.

NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased.

J – The reported result is an estimated value.

* – Duplicate analysis not within control limits; indeterminate bias direction.

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one for the field blank analysis.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ Quantitation checks | √ Data qualifiers |
| √ Data package completeness | |

Hexavalent chromium was detected in 16 of the 28 soil samples analyzed in SDG JB52025. Hexavalent chromium was detected in seven of the samples with concentrations greater than the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries. The RPD value for the duplicate analysis in QC Batch GP75897 was outside QC limits, but was considered acceptable due to low duplicate and sample concentration (differed by less than twice the reporting limit).

Calibrations

The initial calibrations demonstrated acceptable correlation coefficients with values exceeding 0.9998 for the soil sample analyses and 0.9997 for the aqueous sample (field blank) analysis, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 92.1% to 97.5% for the two QC batches associated with the 28 soil samples, and 97.7% to 98.3% for the aqueous sample analysis, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 8. No hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 8. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75896	JB52025-1	Cr ⁺⁶ , soluble	82.6 %	----	----
GP75896	JB52025-1	Cr ⁺⁶ , insoluble	91.6 %	----	----
GP75897	JB52025-28	Cr ⁺⁶ , soluble	78.9 %	----	----
GP75897	JB52025-28	Cr ⁺⁶ , insoluble	90.6 %	---	----
GN94417	JB52011-3	Cr ⁺⁶ , soluble	87.06 %		

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium

Duplicate Sample Analysis

The duplicate analysis result for QC sample JB52025-28 was 105.5%RPD. However, this was attributable to the fact that the "raw value" sample results were both below the reporting limit of < 0.43 mg/Kg. Thus, the results actually meet the QC limit of differing by less than twice the reporting limit (< 2 × CRQL) for low-level (< 5 × reporting limit) concentrations. The remaining duplicate analyses met QC requirements with values less than 3.7 %RPD, including Cr+6, redox potential and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 86.5% to 94.9% for the soil analyses and 100% for the aqueous sample analysis, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches for the soil sample analysis. This is not a required analysis of the method.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The non-detect hexavalent chromium results for the two pairs of field duplicate samples in Table 9 for SDG JB52025 were almost identical and, thus, demonstrate excellent sampling representativeness and precision.

Table 9. Comparison of Field Duplicate Soil Sample Results – SDG JB52025

Analyte	GD012 0"-6" (mg/Kg)	DUP 06 (mg/Kg)	% RPD	DV Flag
Hex. chromium	< 0.43	< 0.41	< 2 × CRQL	-
Analyte	GD014 9-9.5 (mg/Kg)	DUP 07 (mg/Kg)	% RPD	DV Flag
Hex. chromium	< 0.55	< 0.51	< 2 × CRQL	-
< – The analyte was not detected at the stated reporting limit. CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit. < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.				

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$Cr^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

- Where:
- A = conc. from calibration curve (mg/L)
 - B = Final digested volume (L)
 - C = Wet wt of sample (Kg)
 - D = % Solids/100
 - E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample GD012 7.5-8 (JB520265-30) was listed as 524 mg/Kg on the reporting form and 0.2716 mg/L for a 25-fold dilution on the quantitation report in the raw data. A calculation check provides the following result:

$$Cr^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$Cr^{+6} \text{ (mg/Kg)} = \frac{0.2716 \text{ mg/L} \times 0.1 \text{ L} \times 25}{0.00242 \text{ Kg} \times 53.5/100} = \frac{0.6790}{0.0012947} = 524.4446 \text{ mg/Kg}$$

$$Cr^{+6} \text{ (mg/Kg)} = 524 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 524 mg/Kg for Sample GD012 7.5-8 was correctly reported. This was the highest detected Cr⁺⁶

concentration detected among the 28 soil samples of this SDG, JB52025, a value clearly above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

All of the 28 soil samples fell below the Eh-pH phase diagram line. These results suggest that all of the samples experience conditions of a “reducing” soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. However, there were seven of the detected Cr+6 concentrations which were above the SRS of 20 mg/Kg, the highest being 524 mg/Kg in GD012 7.5-8 (JB52025-30). The other results included a high of 93.6, one 37.7 mg/Kg result, while the others were less than 28 mg/Kg. All of these results were associated with samples with soil conditions representative of a “reducing” environment.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were within QC limits, as were all other QC results associated with the hexavalent chromium analysis, including the duplicate sample analysis, no Cr⁺⁶ results were qualified following the DV review.

SDG JB52025R

One soil sample (JB52025-19R) was re-analyzed for SPLP leachate analysis of nickel in Sample 107_I044 11.5-12. Note that the laboratory still presented the client ID as 107_I044 11.2-12 in the data package.

All QC results were within control limits, except for the 12.4%D serial dilution result for nickel. Thus, the nickel result in Sample JB52025-19R is subject to qualification as an estimated value to be flagged with “EJ” (Table 10). The nickel result in the initial soil sample analysis was 2710 E mg/Kg, because the concentration had exceeded the calibration range of the instrument.

Table 10. Qualified SPLP Leachate Results

Sample ID	Lab ID	Analyte	Result (mg/L)	DV Qualifier
107_I044 11.5-12	JB52025-19R	Nickel	0.040	EJ
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.				

SDG JB52025T

One soil sample (JB52025-19T) was re-analyzed for the five target metals in Sample 107_I044 11.5-12. Note that the laboratory again presented the client ID as 107_I044 11.2-12 in the data package.

The QC results were within control limits, except for the 39.8% and 39.1% MS/MSD recoveries for antimony, and the 36.2 %RPD duplicate analysis result for vanadium. Thus, the antimony result in Sample JB52025-19T is subject to qualification as an estimated value to be flagged with “NJ-” due

to potential low bias in the ability to recover antimony if the sample matrix, and the vanadium result qualified as an estimated value flagged with "EJ" for possible variability in the analytical precision potentially due to variability in analytical precision or sample non-homogeneity. The qualified results are presented in Table 11.

Table 11 Qualified Results for Re-analysis of Sample JB52025-19T

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
107_I044 11.5-12	JB52025-19T	Antimony	< 7.3	NJ-
107_I044 11.5-12	JB52025-19T	Vanadium	28.1	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction;
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
<	The compound was analyzed, but was not detected at the stated reporting limit.
J	The reported result is an estimated value.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits;
*J	Duplicate analysis not within control limits; estimated value with an indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference; indeterminate bias direction.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, **Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16**, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, **Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4**, Trenton, New Jersey.

US EPA, CLP, 2010, **"National Functional Guidelines for Inorganic Superfund Data Review"**, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, **Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13**, September 2006.

US EPA, 1997, **Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III**, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, **Guidance for Data Usability in Risk Assessment (Part A) Final**, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG

SDG JB52025/JB52025 R/52025T

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why. *Matrix interference for metals analysis and high Cr⁺⁶ concentrations above calibration range.*

(2x) JB52025-10, 11. (10x) JB52025-9, 14, 16, 31
(4x) JB52025-15, 25A. Cr⁺⁶: JB52025-5 (5x)
(5x) JB52025-19, 22, 24, 29, 30. JB52025-30 (25x)

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

Antimony in JB52025- 9, 14, 30, 31 and -19T

Thallium in JB52025- 9, 14, 16, 30, 31 and 19T.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Thirteen nickel: JB52025-5, 9, 11, 14, 15, 16, 18, 19, 23, 24, 27, 30, 32.

One Antimony: JB52025-16

One Thallium: JB52025-19

Seven Cr⁺⁶: JB52025-15, 16, 21, 22, 23, 30, 31.

Three Vanadium: JB52025-9, 14, 30.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to report discussions of case narrative regarding QC limit exceedances.

No analytical problems regarding procedures was noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 5 and 8 for details.

Qualified sample results are presented in Tables 7, 10, and 11 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB52135
Sample Date: November 5, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: February 14, 2014

This data validation (DV) report presents the data review and result qualifications for thirty-two (32) soil samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 5, 2013 for sample delivery group (SDG) JB52135. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB52135 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 32 collected soil samples.

Following the detailed DV review, the following sample results were qualified:

- Antimony (*NJ-) in Samples JB52135-1 through -11 (inclusive);
- Antimony (NJ-) in Samples JB52135-12 through -32 (inclusive);
- Chromium (EJ) in Samples JB52135-12 through -31 (inclusive);
- Chromium (ENJ-) in Sample JB52135-32;
- Nickel (NJ-) in Samples JB52135-1 through -11 (inclusive);
- Nickel (*ENJ-) in Samples JB52135-12 through -31 (inclusive);
- Nickel (ENJ+) in Sample JB52135-32;
- Vanadium (*J) in Samples JB52135-1 through -11 (inclusive);
- Vanadium (ENJ-) in Samples JB52135-12 through -32 (inclusive);
- Hexavalent chromium (*J) in Samples JB52135-1 through -13 (inclusive);
- Hexavalent chromium (NJ-) in Samples JB52135-14 through -32 (inclusive).

No other sample results in SDG JB53125 required qualification. Details are provided in the tables and text below. The individual sample results that were qualified following the DV review are identified in Tables 7 and 11 of this DV report.

The reported concentrations were below the respective site remediation standard (SRS) limits, except for eleven nickel results, two vanadium and one hexavalent chromium (Cr^{+6}) result. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The thirty-two (32) soil samples collected November 5, 2013, were received the same day at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 3.4°C. The samples destined for metals analysis were received at the Accutest Laboratories Southeast, Inc. in Orlando, Florida November 7, 2013 preserved and in good condition with sampling cooler temperatures of 3.8°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary – SDG JB52135

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ED014 9.5-10.	JB52135-1	11/5/13	Soil	Metals, Cr+6
ED014 10.5-11	JB52135-2	11/5/13	Soil	Metals, Cr+6
ED014 11.5-12	JB52135-3	11/5/13	Soil	Metals, Cr+6
ED014 12.5-13	JB52135-4	11/5/13	Soil	Metals, Cr+6
ED014 13.5-14	JB52135-5	11/5/13	Soil	Metals, Cr+6
DUP 09	JB52135-6	11/5/13	Soil	Metals, Cr+6
DUP 10	JB52135-7	11/5/13	Soil	Metals, Cr+6
DD006 0.5-1	JB52135-8	11/5/13	Soil	Metals, Cr+6
DD006 2-2.5	JB52135-9	11/5/13	Soil	Metals, Cr+6
DD006 4-4.5	JB52135-10	11/5/13	Soil	Metals, Cr+6
DD006 6-6.5	JB52135-11	11/5/13	Soil	Metals, Cr+6
DD006 8-8.5	JB52135-12	11/5/13	Soil	Metals, Cr+6
DUP 11	JB52135-13	11/5/13	Soil	Metals, Cr+6
DUP 12	JB52135-14	11/5/13	Soil	Metals, Cr+6
ED002 0.5-1	JB52135-15	11/5/13	Soil	Metals, Cr+6
ED002 2-2.5	JB52135-16	11/5/13	Soil	Metals, Cr+6
ED002 4-4.5	JB52135-17	11/5/13	Soil	Metals, Cr+6
ED002 6-6.5	JB52135-18	11/5/13	Soil	Metals, Cr+6
ED002 8-8.5	JB52135-19	11/5/13	Soil	Metals, Cr+6
DUP 13	JB52135-20	11/5/13	Soil	Metals, Cr+6
DUP 14	JB52135-21	11/5/13	Soil	Metals, Cr+6
DD007 0.5-1	JB52135-22	11/5/13	Soil	Metals, Cr+6
DD007 2-2.5	JB52135-23	11/5/13	Soil	Metals, Cr+6
DD007 4-4.5	JB52135-24	11/5/13	Soil	Metals, Cr+6
DD007 6-6.5	JB52135-25	11/5/13	Soil	Metals, Cr+6
DD007 8-8.5	JB52135-26	11/5/13	Soil	Metals, Cr+6
DUP 15	JB52135-27	11/5/13	Soil	Metals, Cr+6
DD008 0.5-1	JB52135-28	11/5/13	Soil	Metals, Cr+6
DD008 2-2.5	JB52135-29	11/5/13	Soil	Metals, Cr+6
DD008 4-4.5	JB52135-30	11/5/13	Soil	Metals, Cr+6
DD008 6-6.5	JB52135-31	11/5/13	Soil	Metals, Cr+6
DD008 8-8.5	JB52135-32	11/5/13	Soil	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando Florida.
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB52135, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|----------------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Samples | Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. The sample results exhibited concentrations below the respective site remediation standard (SRS) levels for metals in the 32 soil samples of this SDG, except for eleven nickel results and two vanadium results.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in each of the three QC batches of this SDG, as were the nickel matrix spike recoveries. The MS/MSD recovery for chromium and the MSD for vanadium were also outside control limits in QC Batch MP26349, but the spike amounts were low relative to the sample amounts. The MS/MSD recoveries were outside QC limits in QC Batch MP26350, while the MS/MSD recoveries for antimony, chromium, nickel and vanadium were outside QC limits in MP26356. Duplicate analysis results were outside control limits for antimony and vanadium in MP26349, while the duplicate analysis nickel results were outside control limits in MP26350. The case narrative also identified the serial dilution result being outside QC limits in QC Batches MP26350 and MP26356 for antimony, chromium, nickel and vanadium and stated that the percent difference was acceptable due to low initial sample concentration (< 50 times IDL). However, closer inspection of the data during the DV review revealed that this statement only applied to antimony, while the other three analytes had concentrations greater than 50 times the IDL. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. The QC results for the hexavalent chromium analyses are presented in the hexavalent chromium text. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard area counts identified below.

The exceptions included the internal standard area counts for IS#2 which is associated with chromium and vanadium in analytical runs MA11209 and MA11211 and IS#1 which is associated with antimony in sample JB52135-30 of MA11209. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, each of the four affected samples exhibited area counts of under 130%, thereby meeting the calibration requirements, as the IS area counts are considered acceptable. Thus, the samples did not warrant reanalysis and the results for the associated chromium, vanadium, and antimony are considered acceptable for these four samples. Therefore, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks or the continuing calibration blanks, except thallium, at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB52135. Although thallium was detected above the reporting limit in several CCBs, no results were subject to qualification for associated QC blank contamination, because the affected samples were reanalyzed and thallium was subsequently not detected in any of the soil samples of this SDG.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for QC samples in the three identified QC batches associated with the soil samples which are summarized in Table 2 below. The nickel MS recovery in QC Batch MP26349 was below QC limits, while the MS/MSD recoveries were low in MP26350. The MS recovery for nickel in MP26356 was above QC limits, as presented below in Table 2. The vanadium spike recoveries were below QC limits in the MSD sample in MP256350, while the vanadium and chromium recoveries were below QC limits in the MS/MSD samples of MP26356. The nickel MS recovery in QC Batch MP26356 was above QC limits, as presented below in Table 2. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity.

Following the DV review, the sample results associated with low MS and/or MSD recoveries were subject to qualification and were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential low bias in the ability to recovery these affected analytes in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The detected nickel result associated with QC Batch MP26356 was qualified as an estimated value and flagged with "NJ+" due to a potential positive (high) bias. Although the chromium MS/MSD recoveries in MP26349 and MP26350, as well as the vanadium recoveries in MP26349 were outside QC limits, the associated sample results were not subject to qualification because the ability to recover the spike may have been masked by the large initial sample concentrations which were more than four times the spike value (USEPA, 2010). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26349 Ω	JB52135-1	Antimony	67.5 %	13.7 %	NJ-	Low
MP26349 Ω	JB52135-1	Chromium	-2658 %	-6650 %	----	***
MP26349 Ω	JB52135-1	Nickel	13.6 %	89.9 %	NJ-	Low
MP26349 Ω	JB52135-1	Vanadium	117.4 %	217.7 %	----	***
MP26350 †	JB52135-12	Antimony	22.5 %	22.0 %	NJ-	Low
MP26350 †	JB52135-12	Chromium	-839 %	-977 %	----	***
MP26350 †	JB52135-12	Nickel	-22.8 %	-6.6 %	NJ-	Low
MP26350 †	JB52135-12	Vanadium	78.3 %	71.5 %	NJ-	Low
MP26356 #	FA9883-1	Antimony	16.5 %	8.9 %	NJ-	Low
MP26356 #	FA9883-1	Chromium	20.7 %	-5.6 %	NJ-	Low
MP26356 #	FA9883-1	Nickel	208.7 %	77.5 %	NJ+	High
MP26356 #	FA9883-1	Vanadium	10.5 %	-13.9 %	NJ-	Low

QC Limits are 75-125%;

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.

*** – Sample concentration > 4 × spike amount; samples not subject to qualification.

MS – Matrix spike

MSD – Matrix spike duplicate.

Ω – The samples associated with QC Batch MP26349 consist of JB52135-1 through -11 (inclusive);

† – The samples associated with QC Batch MP26350 consist of JB52135-12 through -31 (inclusive);

– The samples associated with QC Batch MP26356 consist of JB52135-32.

The antimony results in all of these affected samples are flagged with “NJ-” due to a potential low bias, as were the nickel results in samples JB52135-1 through -31 (inclusive), while the nickel result in JB52135-32 was flagged with “NJ+” as it may exhibit a potential positive bias in the this identified sample. The chromium result in JB52135-32 was also qualified and flagged with “NJ-” as presented below in summary table, Table 7 together with the results qualified for the duplicate and serial dilution analyses results. The vanadium results in Samples JB52135-12 through -32 are flagged with “NJ-” due to a potential low bias.

A possible explanation for the low spike recoveries of antimony may be due to problems with the procedure, as it has been noted in the literature that the use of Methods EPA 3020 and 3050 may be inappropriate for the effective analysis of some metals, including antimony and chromium (Smith, 1999).

Duplicate analysis (QC Limit ≤ 35 %RPD)

The case narrative stated that the RPD of the duplicate analysis for antimony and vanadium were outside QC limits in QC Batch MP26349 due to possible sample non-homogeneity. The case narrative also stated that the RPD of the duplicate analysis for antimony, chromium and nickel were outside QC limits in QC Batch MP26350 due to possible sample non-homogeneity. However, inspection of the data revealed that the RPD values for antimony and chromium were below the 35%RPD QC limit for technical data quality assessment in DV guidelines (USEPA, 2010), such that only the nickel results associated with this QC batch are subject to qualification for analytical precision issues. The duplicate result for antimony in MP26356 was 200%RPD, but this was acceptable because of the low sample concentrations (the difference was less than 2 × CRQL). All remaining %RPD values were below the QC limit of 35%RPD, with values ranging 0 to 32.3%RPD for soil samples and, thus, no other results required qualification.

Thus, the antimony and vanadium results associated with QC Batch MP26349 and the nickel results associated with QC Batch MP26350 are qualified as estimated values and are to be flagged with “*J” due to the potential variability in the analytical precision, though without exhibiting any clear bias direction. When the “*J” qualifiers are combined with the qualifiers associated with the low antimony MS/MSD recoveries in the QC sample of this batch, the antimony results appear with “*NJ-” in the summary table, Table 7, while the nickel results are flagged with “*ENJ-”.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
MP26349 Ω	JB52135-1	Antimony	124.3 %RPD	*J
MP26349 Ω	JB52135-1	Vanadium	38.6 %RPD	*J
MP26350 †	JB52135-12	Nickel	135.2 %D	*J
QC Limit is 35%RPD; * – Duplicate analysis not within control limits; indeterminate bias direction. J – The reported result is an estimated value. Ω – The samples associated with QC Batch MP26349 consist of JB52135-1 through -11 (inclusive); † – The samples associated with QC Batch MP26350 consist of JB52135-12 through -31 (inclusive).				

Aside from the antimony and vanadium results in QC Batch MP26349, and nickel in MP26350, the remaining duplicate analyses demonstrated acceptable analytical precision.

Three pairs of spiked duplicate samples were analyzed in SDG JB52135 and %RPD results reported. Three of the %RPD values were greater than 35%RPD. However, upon closer inspection of the data, it was observed that the differences were likely attributable due to the difference in spike values in the spike duplicates, rather than differences attributable to issues with analytical precision. Consequently, it was judged appropriate to not qualify the associated sample results because the differences between the spiked sample concentrations were proportional to the differences in the spike amounts.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 93.9% - 102.0% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative stated that the RPDs for antimony, chromium, nickel, and vanadium were outside QC limits in QC Batch MP26350 and QC Batch MP26356, but that the percent difference (%D) values were acceptable due to the low initial sample concentrations (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, upon closer inspection, it was observed that this statement for each batch actually applies only to the antimony results because the initial concentrations of chromium, nickel, and vanadium in the QC samples were, in fact, above the 50 × IDL criterion. The %D values for chromium, nickel and vanadium in both batches exceeded the QC limit of 10%D and are, therefore, subject to qualification. These results are summarized below in Table 4.

Table 4. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26350 †	JB52135-12	Chromium	75.8 %D	EJ
MP26350 †	JB52135-12	Nickel	75.4 %D	EJ
MP26350 †	JB52135-12	Vanadium	75.8 %D	EJ
MP26356 #	FA9883-1	Chromium	19.2 %D	EJ
MP26356 #	FA9883-1	Nickel	15.4 %D	EJ
MP26356 #	FA9883-1	Vanadium	17.9 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
† – The samples associated with QC Batch MP26350 consist of JB52135-12 through -31 (inclusive);
– The samples associated with QC Batch MP26356 consist of JB52135-32.

Consequently, the chromium, nickel, and vanadium results in the associated samples of these two QC batches were qualified as estimated values and flagged with “EJ”, as presented in the summary table, Table 7 below. Because the MS and/or MSD recoveries for nickel and vanadium in MP26350 were below QC limits, and the duplicate analysis for nickel was outside QC limits, the nickel and vanadium results associated with this QC batch are actually flagged with “*ENJ-” and “ENJ-”, respectively, while the chromium, nickel, and vanadium results in Sample JB52135-32 are flagged with “ENJ-”, “ENJ+”, and “ENJ-” in combining the various qualifications in order to avoid redundancy, as presented in Table 7.

The results qualified for serial dilution results are qualified as estimated values due to potential variability likely affected by the presence of some type of matrix interference, but without any determinate bias direction.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

Seven sets of field duplicate samples were collected as part of SDG JB52135. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2012), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the seven pairs of field duplicate samples are presented in Table 5, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar in five of the seven pairs of samples analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 38 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all analyte pairs, except for the chromium results for the field duplicates from DD007 2-2.5 and DD007 6-6.5, and the nickel results from DD006 8-8.5 and DD007 6-6.5. Soil sample non-homogeneity may have contributed to the observed disparities.

Table 5. Comparison of Field Duplicate Soil Sample Results – SDG JB52135

Analyte	DD006 6-6.5 (mg/Kg)	DUP 09 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.1 *NJ-	< 2.5 *NJ-	< 2 × CRQL	-
Chromium	32.8	30.7	6.6 %	-
Nickel	17.5 NJ-	16.4 NJ-	6.5 %	-
Thallium	< 2.1	< 1.2	< 2 × CRQL	-
Vanadium	28.5 *J	24.9 *J	13.5 %	-
Analyte	DD006 8-8.5 (mg/Kg)	DUP 10 (mg/Kg)	% RPD	DV Flag
Antimony	3.7 NJ-	< 7.2 *NJ-	< 2 × CRQL	-
Chromium	205 EJ	149	31.6 %	-
Nickel	83.7 *ENJ-	28.6 NJ-	98.1 %	(J)
Thallium	< 0.62	< 3.6	< 2 × CRQL	-
Vanadium	32.6 ENJ-	38.1 *J	15.6 %	-
Analyte	ED002 6-6.5 (mg/Kg)	DUP 11 (mg/Kg)	% RPD	DV Flag
Antimony	< 2.6 NJ-	< 2.5 NJ-	< 2 × CRQL	-
Chromium	13.5 EJ	17.3EJ	24.7 %	-
Nickel	12.9 *ENJ-	15.0 *ENJ-	15.1 %	-
Thallium	< 1.3	< 1.2	< 2 × CRQL	-
Vanadium	19.4 ENJ-	17.1 ENJ-	12.6 %	-
Analyte	ED002 8-8.5 (mg/Kg)	DUP 12 (mg/Kg)	% RPD	DV Flag
Antimony	< 1.8 NJ-	< 1.9 NJ-	< 2 × CRQL	-
Chromium	9.7 EJ	10.0 EJ	3.0 %	-
Nickel	10.9 *ENJ-	9.8 *ENJ-	10.6 %	-
Thallium	< 0.91	< 0.93	< 2 × CRQL	-
Vanadium	14.3 ENJ-	14.8 ENJ-	3.4 %	-

Analyte	DD007 2-2.5 (mg/Kg)	DUP 13 (mg/Kg)	% RPD	DV Flag
Antimony	< 2.0 NJ-	< 1.9 NJ-	< 2 × CRQL	-
Chromium	24.6 EJ	41.9 EJ	52.0 %	(J)
Nickel	42.4 *ENJ-	36.0 *ENJ-	16.3 %	-
Thallium	< 0.99	< 0.96	< 2 × CRQL	-
Vanadium	18.4 ENJ-	21.6 ENJ-	16.0 %	-
Analyte	DD007 6-6.5 (mg/Kg)	DUP 14 (mg/Kg)	% RPD	DV Flag
Antimony	< 3.6 NJ-	< 4.3 NJ-	< 2 × CRQL	-
Chromium	13.9 EJ	33.1 EJ	81.7 %	(J)
Nickel	12.2 *ENJ-	24.6 *ENJ-	67.4 %	(J)
Thallium	< 1.8	< 2.1	< 2 × CRQL	-
Vanadium	18.0 ENJ-	22.8 ENJ-	23.5 %	-
Analyte	DD008 2-2.5 (mg/Kg)	DUP 15 (mg/Kg)	% RPD	DV Flag
Antimony	< 1.9 NJ-	< 2.2 NJ-	< 2 × CRQL	-
Chromium	22.1 EJ	32.3 EJ	37.5 %	-
Nickel	35.6 *ENJ-	28.4 *ENJ-	22.5 %	-
Thallium	< 0.96	< 1.1	< 2 × CRQL	-
Vanadium	18.7 ENJ-	23.1 ENJ-	21.0 %	-

< – The analyte was not detected at the stated reporting limit;
J – The reported result is an estimated value;
NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high;
NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;
* – The duplicate analysis result is outside QC limits;
*J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction;
EJ – The reported value is estimated because of the presence of interference.
(J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy;
CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
< 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

Consequently, due to the disparity in the respective detected chromium and nickel results for the field duplicate samples from DD006 8-8.5, DD007 2-2.5, and DD007 6-6.5, these results are subject to qualification and are to be flagged with “J”, as indicated in Table 5 above. However, the chromium results from the field duplicates of DD007 2-2.5 and DD007 6-6.5 are already qualified and flagged with “EJ” and the nickel results from DD006 8-8.5 and DD007 6-6.5 are already qualified and flagged with either “*ENJ-” or “NJ-”. Consequently, these affected sample results were not further flagged with an additional “J” in an effort to avoid redundancy in the applied qualifiers. Otherwise, the field duplicate results in six of these seven pairs of field duplicate samples demonstrated very good sampling representativeness and precision, with results generally less than 25%RPD.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The vanadium concentration for Sample DD007 4-4.5 (JB52135-24) was listed as 115 mg/Kg on the reporting form and 2.261 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(2.261 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.09 \text{ g})(90.3/100\%)} = \frac{113,050}{95.022} = 114.7658 \mu\text{g/g}$$

= 115 mg/Kg, dry weight

After rounding to three significant figures, this verifies that the vanadium concentration of 115 mg/Kg for Sample DD007 4-4.5 was correctly reported. This was the highest vanadium concentration of the samples in this SDG, a value above the SRS of 78 mg/Kg.

Reporting Limits

The case narrative did identify that there were many samples that were diluted. There were actually 11 samples that were diluted by a factor of two (2×), nine by a factor of four (4×), one by a factor of five (5×), with one sample diluted by a factor of ten (10×) for reporting the antimony, chromium, thallium and vanadium results (JB52135-1).

The affected samples with the adjusted reporting limits above the respective SRS values are presented below in Table 6. While the reporting limits for antimony, chromium, nickel, thallium and vanadium became elevated upon dilution, only those antimony and thallium reporting limits tabulated below were observed to fall above the respective SRS values.

Table 6. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit	Dilution Factor	Adjusted Result (mg/Kg)	Remediation Standard
ED014 9.5-10	JB52135-1	Thallium	< 0.54	10	< 5.4	3
DUP 10	JB52135-7	Antimony	< 1.44	5	< 7.2	6
DUP 10	JB52135-7	Thallium	< 0.72	5	< 3.6	3
DD007 4-4.5	JB52135-24	Thallium	< 2.0	2	< 4.0	3

Units – mg/Kg
< - The analyte was analyzed for, but was not detected above the stated reporting limit.

For samples of this SDG, the thallium reporting limit generally is approximately 0.5 mg/Kg for an undiluted sample. However, in Sample JB52135-24, the analyst compensated for the observed presence of some interference in the raw data and raised the reporting limit higher as a conservative measure, as explained by the laboratory representative.

Although some samples were diluted up to a dilution factor of 10, only the reporting levels of these three samples exceeded the respective SRS values for antimony and thallium, as presented above

in Table 6, some due to the low percent solids found in the sample which effected a raising of the reporting limit above the two SRS values, such as that observed for Sample JB52135-7. Other sample reporting limits, irrespective of the applied dilution, were all below the respective SRS values in the remaining soil samples of SDG JB52135. These elevated reporting limits did not compromise the evaluation of the sample results for JB52135-1 and JB52135-24, because the nickel and vanadium concentrations in both samples exceeded the SRS criteria of 31 mg/Kg and 78 mg/Kg, respectively, and these nickel and vanadium results are what drive the evaluation of these sample results. With possible exception of sample JB52135-7, whose antimony and thallium reporting limits did not significantly exceed the respective SRS values, the elevated reporting limits for antimony or thallium did not compromise the project evaluation procedure.

Summary

The soil sample analytical results for the samples of SDG JB52135 were found to be compliant with the analytical methods for the analysis of metals in the thirty-two soil samples using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries, differences in the duplicate sample analysis and differences in the serial dilution analysis, as summarized in Tables 2, 3, and 4. The associated sample results are qualified accordingly and listed in Table 7 below. Sample analyte results are flagged with either "NJ-", "*NJ-", "*J", "EJ", "ENJ-", or "*ENJ-".

Field duplicate sample results were subject to qualification included a few chromium and nickel results that were to be flagged with "J", as indicated above in Table 5. However, the affected chromium and nickel results were not additionally flagged with "J", because the results are already qualified as estimated values with either "EJ" for possible variability in the chromium results, and either "*ENJ-" or "NJ-" for nickel in these samples due to the potential low bias, as indicated in Table 7.

Table 7 Summary Qualified Sample Metals Results in SDG JB52135

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED014 9.5-10	JB52135-1	Antimony	15.7	*NJ-
ED014 9.5-10	JB52135-1	Nickel	83.7	NJ-
ED014 9.5-10	JB52135-1	Vanadium	180	*J
ED014 10.5-11	JB52135-2	Antimony	2.5	*NJ-
ED014 10.5-11	JB52135-2	Nickel	35.2	NJ-
ED014 10.5-11	JB52135-2	Vanadium	21.3	*J
ED014 11.5-12	JB52135-3	Antimony	3.7	*NJ-
ED014 11.5-12	JB52135-3	Nickel	24.2	NJ-
ED014 11.5-12	JB52135-3	Vanadium	13.3	*J
ED014 12.5-13	JB52135-4	Antimony	2.1	*NJ-
ED014 12.5-13	JB52135-4	Nickel	51.2	NJ-
ED014 12.5-13	JB52135-4	Vanadium	14.7	*J
ED014 13.5-14	JB52135-5	Antimony	< 5.5	*NJ-
ED014 13.5-14	JB52135-5	Nickel	95.7	NJ-
ED014 13.5-14	JB52135-5	Vanadium	34.7	*J
DUP 09	JB52135-6	Antimony	< 2.5	*NJ-
DUP 09	JB52135-6	Nickel	16.4	NJ-
DUP 09	JB52135-6	Vanadium	24.9	*J
DUP 10	JB52135-7	Antimony	< 7.2	*NJ-
DUP 10	JB52135-7	Nickel	28.6	NJ-
DUP 10	JB52135-7	Vanadium	38.1	*J

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD006 0.5-1	JB52135-8	Antimony	4.7	*NJ-
DD006 0.5-1	JB52135-8	Nickel	29.2	NJ-
DD006 0.5-1	JB52135-8	Vanadium	46.9	*J
DD006 2-2.5	JB52135-9	Antimony	< 1.0	*NJ-
DD006 2-2.5	JB52135-9	Nickel	145	NJ-
DD006 2-2.5	JB52135-9	Vanadium	15.4	*J
DD006 4-4.5	JB52135-10	Antimony	3.1	*NJ-
DD006 4-4.5	JB52135-10	Nickel	12.2	NJ-
DD006 4-4.5	JB52135-10	Vanadium	16.2	*J
DD006 6-6.5	JB52135-11	Antimony	< 4.1	*NJ-
DD006 6-6.5	JB52135-11	Nickel	17.5	NJ-
DD006 6-6.5	JB52135-11	Vanadium	28.5	*J
DD006 8-8.5	JB52135-12	Antimony	3.7	NJ-
DD006 8-8.5	JB52135-12	Chromium	205	EJ
DD006 8-8.5	JB52135-12	Nickel	83.7	*ENJ-
DD006 8-8.5	JB52135-12	Vanadium	32.6	ENJ-
DUP 11	JB52135-13	Antimony	< 2.7	NJ-
DUP 11	JB52135-13	Chromium	17.3	EJ
DUP 11	JB52135-13	Nickel	15.0	*ENJ-
DUP 11	JB52135-13	Vanadium	17.1	ENJ-
DUP 12	JB52135-14	Antimony	< 1.9	NJ-
DUP 12	JB52135-14	Chromium	10.0	EJ
DUP 12	JB52135-14	Nickel	9.8	*ENJ-
DUP 12	JB52135-14	Vanadium	14.8	ENJ-
ED002 0.5-1	JB52135-15	Antimony	< 3.5	NJ-
ED002 0.5-1	JB52135-15	Chromium	86.4	EJ
ED002 0.5-1	JB52135-15	Nickel	30.9	*ENJ-
ED002 0.5-1	JB52135-15	Vanadium	38.6	ENJ-
ED002 2-2.5	JB52135-16	Antimony	< 3.7	NJ-
ED002 2-2.5	JB52135-16	Chromium	17.7	EJ
ED002 2-2.5	JB52135-16	Nickel	12.5	*ENJ-
ED002 2-2.5	JB52135-16	Vanadium	27.1	ENJ-
ED002 4-4.5	JB52135-17	Antimony	< 0.97	NJ-
ED002 4-4.5	JB52135-17	Chromium	104	EJ
ED002 4-4.5	JB52135-17	Nickel	25.4	*ENJ-
ED002 4-4.5	JB52135-17	Vanadium	40.4	ENJ-
ED002 6-6.5	JB52135-18	Antimony	< 2.6	NJ-
ED002 6-6.5	JB52135-18	Chromium	13.5	EJ
ED002 6-6.5	JB52135-18	Nickel	12.9	*ENJ-
ED002 6-6.5	JB52135-18	Vanadium	19.4	ENJ-
ED002 8-8.5	JB52135-19	Antimony	< 1.8	NJ-
ED002 8-8.5	JB52135-19	Chromium	9.7	EJ
ED002 8-8.5	JB52135-19	Nickel	10.9	*ENJ-
ED002 8-8.5	JB52135-19	Vanadium	14.3	ENJ-
DUP 13	JB52135-20	Antimony	< 1.9	NJ-
DUP 13	JB52135-20	Chromium	41.9	EJ
DUP 13	JB52135-20	Nickel	36.0	*ENJ-
DUP 13	JB52135-20	Vanadium	21.6	ENJ-
DUP 14	JB52135-21	Antimony	< 4.3	NJ-
DUP 14	JB52135-21	Chromium	33.1	EJ
DUP 14	JB52135-21	Nickel	24.6	*ENJ-
DUP 14	JB52135-21	Vanadium	22.8	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD007 0.5-1	JB52135-22	Antimony	< 3.5	NJ-
DD007 0.5-1	JB52135-22	Chromium	28.0	EJ
DD007 0.5-1	JB52135-22	Nickel	20.6	*ENJ-
DD007 0.5-1	JB52135-22	Vanadium	28.0	ENJ-
DD007 2-2.5	JB52135-23	Antimony	< 2.0	NJ-
DD007 2-2.5	JB52135-23	Chromium	24.6	EJ
DD007 2-2.5	JB52135-23	Nickel	42.4	*ENJ-
DD007 2-2.5	JB52135-23	Vanadium	18.4	ENJ-
DD007 4-4.5	JB52135-24	Antimony	4.7	NJ-
DD007 4-4.5	JB52135-24	Chromium	19.3	EJ
DD007 4-4.5	JB52135-24	Nickel	32.5	*ENJ-
DD007 4-4.5	JB52135-24	Vanadium	115	ENJ-
DD007 6-6.5	JB52135-25	Antimony	< 3.6	NJ-
DD007 6-6.5	JB52135-25	Chromium	13.9	EJ
DD007 6-6.5	JB52135-25	Nickel	12.2	*ENJ-
DD007 6-6.5	JB52135-25	Vanadium	18.0	ENJ-
DD007 8-8.5	JB52135-26	Antimony	< 4.0	NJ-
DD007 8-8.5	JB52135-26	Chromium	10.9	EJ
DD007 8-8.5	JB52135-26	Nickel	8.6	*ENJ-
DD007 8-8.5	JB52135-26	Vanadium	14.8	ENJ-
DUP 15	JB52135-27	Antimony	< 2.2	NJ-
DUP 15	JB52135-27	Chromium	32.3	EJ
DUP 15	JB52135-27	Nickel	28.4	*ENJ-
DUP 15	JB52135-27	Vanadium	23.1	ENJ-
DD008 0.5-1	JB52135-28	Antimony	< 0.88	NJ-
DD008 0.5-1	JB52135-28	Chromium	49.2	EJ
DD008 0.5-1	JB52135-28	Nickel	23.6	*ENJ-
DD008 0.5-1	JB52135-28	Vanadium	22.2	ENJ-
DD008 2-2.5	JB52135-29	Antimony	< 1.9	NJ-
DD008 2-2.5	JB52135-29	Chromium	22.1	EJ
DD008 2-2.5	JB52135-29	Nickel	35.6	*ENJ-
DD008 2-2.5	JB52135-29	Vanadium	18.7	ENJ-
DD008 4-4.5	JB52135-30	Antimony	< 0.98	NJ-
DD008 4-4.5	JB52135-30	Chromium	14.7	EJ
DD008 4-4.5	JB52135-30	Nickel	21.1	*ENJ-
DD008 4-4.5	JB52135-30	Vanadium	24.9	ENJ-
DD008 6-6.5	JB52135-31	Antimony	< 4.4	NJ-
DD008 6-6.5	JB52135-31	Chromium	19.7	EJ
DD008 6-6.5	JB52135-31	Nickel	17.3	*ENJ-
DD008 6-6.5	JB52135-31	Vanadium	23.9	ENJ-
DD008 8-8.5	JB52135-32	Antimony	5.4	NJ-
DD008 8-8.5	JB52135-32	Chromium	450	ENJ-
DD008 8-8.5	JB52135-32	Nickel	50.0	ENJ+
DD008 8-8.5	JB52135-32	Vanadium	45.8	ENJ-

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

J – The reported result is an estimated value;

NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;

NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high;

* – The duplicate analysis result is outside quality control limits.

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
E – The reported value is estimated because of the presence of interference.				

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

Hexavalent chromium was detected in 19 of 32 soil samples analyzed in SDG JB52135 with detected concentrations of 11.2 or less, except the 43.4 mg/Kg result in JB52135-1, such that only one Cr+6 result had exceeded the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that the QC requirements were met, including the holding time, method blanks, as well as the QC requirements for the pH, and redox potential analyses, except for the soluble and insoluble MS recoveries in QC Batch GP75928 for QC Sample DD008 4-4.5; and the soluble MS recovery in QC Batch GP75919 (DD006 2-2.5) which also exceeded the RPD QC limit in the duplicate analysis.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.99988, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 93.8% to 96.6% for the two QC batches associated with the 32 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 8, except for the MS recoveries in QC Batch GP75928.

Table 8. Hexavalent Chromium Analysis Matrix Spike Recovery Results – SDG JB52135

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75919 Θ	JB52135-9	Cr ⁺⁶ , soluble	74.9 %	----	----
GP75919 Θ	JB52135-9	Cr ⁺⁶ , insoluble	101.1 %	----	----
GP75919 Θ	JB52135-9	Cr ⁺⁶ , post spike	99.0 %	----	----
GP75928 §	JB52135-30	Cr ⁺⁶ , soluble	1.9 %	NJ-	Low
GP75928 §	JB52135-30	Cr ⁺⁶ , insoluble	69.0 %	NJ-	Low
GP75928 §	JB52135-30	Cr ⁺⁶ , post spike	91.6 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium;
Θ – The samples associated with QC Batch GP75919 consist of JB52135-1 through -13 (inclusive).
§ – The samples associated with QC Batch GP75928 consist of JB52135-14 through -32 (inclusive).

Although the soluble MS recovery in QC Batch 75919 was marginally less than 75%, the associated sample results were not qualified as estimated values because the 74.9% when rounded to two significant figures becomes 75%, a value at the lower limit of the 75-125% QC limits specified in the DV guidelines (NJDEP, 2002). For this reason, the laboratory did not reanalyze the affected sample QC batch.

Although the soluble MS recovery in QC Batch 75928 was less than 50%, the associated sample results were qualified as estimated values and flagged with “NJ-”, because the insoluble recovery was above 50%, due to a potential low bias, as discussed with Mr. Joseph Sanguiliano of the NJDEP. The post spike recovery was within QC limits further supporting the qualification of the associated Cr+6 results, rather than rejection.

Because the soluble and insoluble MS recoveries were below QC limits in QC Batch GP75928, the associated samples were to be reanalyzed. However, due to some miscommunication, the associated samples were not reanalyzed. Consequently, the samples of QC Batch GP75928 numbered JB52135-14 through -32 (inclusive) were qualified as estimated values and flagged with “NJ-”, as presented below in Table 11, due to a potential low bias in the ability to recover Cr+6 in the associated soil sample matrices.

Duplicate Sample Analysis

The duplicate sample analysis was performed on two samples where the differences among the Cr+6, pH, and redox potential were less than 26.7%RPD, except for the 61.0%RPD result in QC sample JB52135-9 in QC Batch GP75919, as depicted in Table 9.

The 61.0%RPD for Cr⁺⁶ was above laboratory QC limits (20%RPD) for the duplicate analysis of Sample JB52135-9 in QC Batch GP75919, but was also above the advisory DV QC guideline of 35%RPD for soil samples (USEPA, 2010; USEPA, 2012). Consequently, the Cr+6 results in the associated samples with laboratory sample ID numbers ranging JB52135-1 through -13 (inclusive) were qualified as estimated values and flagged with ‘*J’ due to a possible variability in the analytical precision. The ‘*’ flag is to indicate that the duplicate analysis of the QC samples were outside QC limits.

Table 9. Duplicate Sample Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
GP75919 Θ	JB52135-9	Hexavalent Chromium	61.0 %RPD	*J

QC Limit is 35%RPD;

J – The reported result is an estimated value.

* – Duplicate analysis not within control limits; indeterminate bias direction.

⊖ – The samples associated with QC Batch GP75919 consist of JB52135-1 through -13 (inclusive).

The other duplicate analyses met QC requirements with values less than 26.7 %RPD, including Cr+6, redox potential and pH analyses. The qualified results are identified in the summary table presented at the end of this DV report in Table 11.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 92.0% to 108.0%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches. This is not a required analysis of the method.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The results for the analysis of the seven pairs of field duplicate samples are presented in Table 10, below.

Table 10. Comparison of Field Duplicate Soil Sample Results – SDG JB52135

Analyte	DD006 6-6.5 (mg/Kg)	DUP 09 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	1.9 *J	6.1 *J	> 2 × CRQL	(J)
Analyte	DD006 8-8.5 (mg/Kg)	DUP 10 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	< 0.58 *J	< 0.60 *J	< 2 × CRQL	-
Analyte	ED002 6-6.5 (mg/Kg)	DUP 11 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	1.2 NJ-	11.2 *J	> 2 × CRQL	(J)
Analyte	ED002 8-8.5 (mg/Kg)	DUP 12 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	2.9 NJ-	< 0.47 NJ-	> 2 × CRQL	(J)
Analyte	DD007 2-2.5 (mg/Kg)	DUP 13 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	0.67 NJ-	1.2 NJ-	< 2 × CRQL	-
Analyte	DD007 6-6.5 (mg/Kg)	DUP 14 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	0.64 NJ-	< 0.46 NJ-	< 2 × CRQL	-
Analyte	DD008 2-2.5 (mg/Kg)	DUP 15 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	< 0.48 NJ-	< 0.49 NJ-	< 2 × CRQL	-

QC Limit is ≤ 50 %RPD;

< – The analyte was not detected at the stated reporting limit;

J – The reported result is an estimated value;

(J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy;

*J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction.

NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is not within QC limits; possible low bias;

CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
 < 2 × CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

It is apparent that the results for the hexavalent chromium concentrations in the field duplicate samples were similar and, thus, considered representative in four of the seven pairs of soil samples, as the concentrations between field duplicate samples differed by less than two times the reporting limit value (< 2 × CRQL), except for the results > 2 × CRQL in field duplicates from DD006 6-6.5, ED002 6-6.5, and ED002 8-8.5.

As a result of the disparity in the respective hexavalent chromium results for the field duplicate samples from DD006 6-6.5, ED002 6-6.5, and ED002 8-8.5, these results are subject to qualification and are to be flagged with “J”, as indicated in Table 10 above. However, the Cr+6 results from all field duplicates are already qualified as estimated values and flagged with either “*J”, or “NJ-”. Consequently, these affected sample results were not further flagged with an additional “J” in an effort to avoid redundancy in the applied qualifiers. Acceptable sampling representativeness and precision was demonstrated in four of the seven pairs of field duplicate soil samples. Even with the observed disparity, which may be attributable to soil sample non-homogeneity or the low concentrations which may magnify the differences values, the results were all clearly below the SRS of 20 mg/Kg facilitating the use of these results in project evaluations.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

- Where:
- A = conc. from calib. curve (mg/L)
 - B = Final digested volume (L)
 - C = Wet wt of sample (Kg)
 - D = % Solids/100
 - E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ED014 9.5-10 (JB52135-1) was listed as 43.4 mg/Kg on the reporting form and 0.8851 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.8851 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00247 \text{ Kg} \times 82.6/100} = \frac{0.08851}{0.0020402} = 43.3825 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 43.4 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 43.4 mg/Kg for Sample ED014 9.5-10 was correctly reported. This was the highest detected Cr⁺⁶ concentration among the 32 soil samples of this SDG, JB52135. Although this result was

above the SRS of 20 mg/Kg, all remaining detected Cr⁺⁶ concentration results were 11.2 mg/Kg or less.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams, except for the Eh result for Sample JB52135-29. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

The redox potential result for Sample JB52135-29 was incorrectly recorded as 2661 mV, which is off scale for the Eh-pH phase diagram. Closer review of the data revealed that 53.9 “mV vs. Ag/AgCl” electrode result was close to the 54.4 value in Sample JB52135-31, whose corresponding redox potential reading was 266.6 mV. Consequently, the result for JB52135-29 should be 266.1 mV which would then fall under the Eh-pH line, leaving only JB52135-20 (1.2 mg/Kg Cr+6) and JB52135-30 (1.3 mg/Kg) which lie above the Eh-pH line representing oxidizing conditions.

All but two of the 32 soil samples fell below the Eh-pH phase diagram line. These results suggest that almost all of the samples experience conditions of a “reducing” soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of these two samples experiencing oxidizing conditions, the highest detected Cr+6 concentration was 1.3 mg/Kg in JB52135-30. Only one result of the samples in this SDG (43.4 mg/Kg in JB52135-1) was detected above the SRS of 20 mg/Kg, even though the sample fell below the Eh-pH line demonstrating “reducing” conditions.

Summary for Hexavalent Chromium Analysis SDG JB52135

Since the MS recoveries in QC Batch GP75928 (JB52135-30) were below QC limits, as depicted in Table 8, the sample Cr+6 results were qualified as estimated values and flagged with “NJ-”. Consequently, the sample results associated with this QC batch are flagged with “NJ-” in Table 11, below. The samples associated with QC Batch GP75928 consist of JB52315-14 through -32 (inclusive). The samples required re-digestion and re-analysis due to the low MS recoveries, however, the samples were not reanalyzed and are left qualified as presented below.

The Cr+6 results in the samples with laboratory sample ID numbers ranging JB52135-1 through -13 (inclusive) were qualified as estimated values and flagged with ‘*J’ due to a possible variability in the analytical precision, as suggested by the 61.0%RPD duplicate analysis result in the QC sample in Batch GP75919.

Table 11. Comparison of Qualified Sample Cr⁺⁶ Results in SDG JB52135

Client ID	Laboratory Sample ID	Analyte	JB52135 Result (mg/Kg)	DV Qualifier
ED014 9.5-10	JB52135-1	Cr+6	43.4	*J
ED014 10.5-11	JB52135-2	Cr+6	< 0.70	*J
ED014 11.5-12	JB52135-3	Cr+6	< 0.59	*J
ED014 12.5-13	JB52135-4	Cr+6	< 0.59	*J
ED014 13.5-14	JB52135-5	Cr+6	< 0.63	*J
DUP 09	JB52135-6	Cr+6	6.1	*J
DUP 10	JB52135-7	Cr+6	< 0.60	*J

Client ID	Laboratory Sample ID	Analyte	JB52135 Result (mg/Kg)	DV Qualifier
DD006 0.5-1	JB52135-8	Cr+6	8.6	*J
DD006 2-2.5	JB52135-9	Cr+6	7.7	*J
DD006 4-4.5	JB52135-10	Cr+6	6.4	*J
DD006 6-6.5	JB52135-11	Cr+6	1.9	*J
DD006 8-8.5	JB52135-12	Cr+6	< 0.58	*J
DUP 11	JB52135-13	Cr+6	11.2	*J
DUP 12	JB52135-14	Cr+6	< 0.47	NJ-
ED002 0.5-1	JB52135-15	Cr+6	3.0	NJ-
ED002 2-2.5	JB52135-16	Cr+6	3.8	NJ-
ED002 4-4.5	JB52135-17	Cr+6	4.6	NJ-
ED002 6-6.5	JB52135-18	Cr+6	1.2	NJ-
ED002 8-8.5	JB52135-19	Cr+6	2.9	NJ-
DUP 13	JB52135-20	Cr+6	1.2	NJ-
DUP 14	JB52135-21	Cr+6	< 0.46	NJ-
DD007 0.5-1	JB52135-22	Cr+6	3.5	NJ-
DD007 2-2.5	JB52135-23	Cr+6	0.67	NJ-
DD007 4-4.5	JB52135-24	Cr+6	0.97	NJ-
DD007 6-6.5	JB52135-25	Cr+6	0.64	NJ-
DD007 8-8.5	JB52135-26	Cr+6	< 0.46	NJ-
DUP 15	JB52135-27	Cr+6	< 0.49	NJ-
DD008 0.5-1	JB52135-28	Cr+6	2.8	NJ-
DD008 2-2.5	JB52135-29	Cr+6	< 0.48	NJ-
DD008 4-4.5	JB52135-30	Cr+6	1.3	NJ-
DD008 6-6.5	JB52135-31	Cr+6	< 0.50	NJ-
DD008 8-8.5	JB52135-32	Cr+6	< 0.52	NJ-
<p>< – The analyte was analyzed for, but not detected at the specified reporting limit. *J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction. NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; possible low bias.</p>				

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
<	The compound was analyzed, but was not detected at the stated reporting limit.
J	The reported result is an estimated value.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	The duplicate analysis result is outside quality control limits.
*J	The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

- AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.
- APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.
- New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.
- New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.
- New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.
- Smith, R-K, 1999, ***Handbook of Environmental Analysis, 4th Edition***, Genium Publishing Corp., Schenectady, New York, 649 pages.
- US EPA, CLP, 2010, ***"National Functional Guidelines for Inorganic Superfund Data Review"***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.
- US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13***, September 2006.
- US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.
- US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB52135

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why. *Matrix interference.*

2x JB52135-6, 13, 14, 18, 19, 20, 23, 24, 27, 29, and 32.
 4x JB52135-5, 11, 15, 16, 21, 22, 25, 26, and 31
 5x JB52135-7

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

JB52135-1 Thallium; JB52135-24 Thallium
 JB52135-7 Antimony and Thallium

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Eleven nickel: JB52135-1, 2, 4, 5, 9, 12, 20, 23, 24, 29, 32
 Two vanadium results: JB52135-1, and -24.
 One Cr⁺⁶: JB52135-1.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative, regarding QC limit exceedances.
 No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 5, 8, 9 and 10 for details.

Qualified sample results are presented in tables 7 and 11 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB52302
Sample Date: November 6, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Faiza M. Botros
Janis V. Giga, Ph.D., REP5554
Report Date: February 10, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-six (26) soil samples and two (2) Field Blanks collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 6, 2013 for sample delivery group (SDG) JB52302. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB52302 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 26 collected soil samples and two Field Blanks.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB52302-1 through -22 (inclusive), and JB52302-23A, -25 and -26;
- Chromium (*EJ) in Samples JB52302-1 through -3 (inclusive);
- Chromium, nickel and vanadium (EJ) in Samples JB52302-4 through -22 (inclusive), and JB52302-24;
- Chromium and nickel (ENJ-) in Samples JB52302-25 and -26;
- Nickel (ENJ+) in Samples JB52302-1 through -3 (inclusive);
- Vanadium (*ENJ+) in Samples JB52302-1 through -3 (inclusive);
- Vanadium (NJ-) in Samples JB52302-25 and -26;
- Hexavalent Chromium (NJ-) in sample JB52302-1 through JB52302-13 (inclusive), and JB52302-27 (FB06) and JB52302-28 (FB07).

No other sample results in SDG JB52302 required qualification. Details are provided in the tables and text below. The individual sample results that were qualified following the DV review are identified in Tables 7 and 10 of this DV report.

The reported concentrations were below the respective site remediation standard (SRS) limits, except for thirteen nickel results, one antimony and one hexavalent chromium (Cr⁺⁶) result. A

data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-six (26) soil samples and two (2) Field Blanks collected on November 6, 2013, were received November 6, 2013 at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 6°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. on November 8, 2013 properly preserved and intact with sampling cooler temperatures of 3.6°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
DD009 0.5-1	JB52302-1	11/06/13	Soil	Metals, Cr+6
DD009 2-2.5	JB52302-2	11/06/13	Soil	Metals, Cr+6
DD009 4-4.5	JB52302-3	11/06/13	Soil	Metals, Cr+6
ED007 0.5-1	JB52302-4	11/06/13	Soil	Metals, Cr+6
ED007 2-2.5	JB52302-5	11/06/13	Soil	Metals, Cr+6
ED007 4-4.5	JB52302-6	11/06/13	Soil	Metals, Cr+6
ED007 6-6.5	JB52302-7	11/06/13	Soil	Metals, Cr+6
ED007 8-8.5	JB52302-8	11/06/13	Soil	Metals, Cr+6
DUP 16	JB52302-9	11/06/13	Soil	Metals, Cr+6
DD011 1.5-2	JB52302-10	11/06/13	Soil	Metals, Cr+6
DD011 2.5-3	JB52302-11	11/06/13	Soil	Metals, Cr+6
DD011 3.5-4	JB52302-12	11/06/13	Soil	Metals, Cr+6
DD011 4.5-5	JB52302-13	11/06/13	Soil	Metals, Cr+6
DD011 5.5-6	JB52302-14	11/06/13	Soil	Metals, Cr+6
DD012 1.5-2	JB52302-15	11/06/13	Soil	Metals, Cr+6
DD012 2.5-3	JB52302-16	11/06/13	Soil	Metals, Cr+6
DD012 3.5-4	JB52302-17	11/06/13	Soil	Metals, Cr+6
DD012 4.5-5	JB52302-18	11/06/13	Soil	Metals, Cr+6
DD012 5.5-6	JB52302-19	11/06/13	Soil	Metals, Cr+6
DUP 17	JB52302-20	11/06/13	Soil	Metals, Cr+6
ED005 0.5-1	JB52302-21	11/06/13	Soil	Metals, Cr+6
ED005 2-2.5	JB52302-22	11/06/13	Soil	Metals, Cr+6
ED005 3.5-4	JB52302-23	11/06/13	Soil	SPLP Leachate Sb
ED005 3.5-4	JB52302-23A	11/06/13	Soil	Sb
ED005 4-4.5	JB52302-24	11/06/13	Soil	Metals, Cr+6
ED005 6-6.5	JB52302-25	11/06/13	Soil	Metals, Cr+6
ED005 8-8.5	JB52302-26	11/06/13	Soil	Metals, Cr+6
FB06	JB52302-27	11/06/13	Aqueous	Metals, Cr+6
FB07	JB52302-28	11/06/13	Aqueous	Metals, Cr+6

Metals – Antimony (Sb), chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast, Inc. in Orlando, FL;
 SPLP Leachate analyzed only for antimony (Sb);
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB52302, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgment, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. There were some sample results of the 26 soil samples that exhibited concentrations above the respective site remediation standard (SRS) levels. These included 13 nickel results and one antimony result.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony and vanadium, and nickel in the MS analysis were identified as being outside QC limits in QC Batch MP26360, while the chromium MS/MSD recoveries were also outside QC limits, but the spike amount was low relative to the sample concentration. The case narrative also identified the RPD results for antimony, chromium and vanadium as being outside QC limits in the duplicate analysis of MP26360. The case narrative also identified the MS/MSD recoveries for antimony and the MS recovery for nickel as being outside QC limits in QC Batch MP26361, while the MS/MSD recoveries for antimony, chromium, nickel and vanadium were outside QC limit in QC Batch MP26362.

The case narrative identified the serial dilution results being outside QC limits in QC batches MP26360 and MP26361 for antimony, chromium, nickel and vanadium and stated that the percent difference was acceptable due to low initial sample concentration (< 50 times IDL). This statement conflicted with other statements stating that the serial dilution results for chromium, nickel, and vanadium indicate possible matrix interference. Apparently this statement should only be applied for antimony. Similar conflicting statements were made regarding the serial dilution results for QC Batch MP26362 for antimony, chromium and nickel, but only chromium and nickel had comments about matrix interference. Elevated reporting limits were listed in the case narrative for most analytes in many samples. Various other comments in the extensive case narrative were presented, however, not all were relevant to qualification in the DV review.

All other QC requirements were met, including analyses for pH, oxidation reduction potential, total solids, and the leachate analysis. Details are discussed in the sections below

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

Almost all QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There were, however, a few exceptions.

One of the exceptions consisted of a low (40%) recovery for antimony below the 70-130% QC limits in the closing CRIA2 standard of analytical sequence MA11213 which followed the analysis of eleven undiluted samples of SDG JB52302. Following a detailed review of reporting limits for the affected samples, it was observed that the detected concentrations and reporting limits for the non-detect results were all above the "affected range" (true spike \pm CRQL) for each of the associated samples and, thus, no sample antimony results are subject to qualification (USEPA, 2010).

Additionally, there were two samples whose internal standard (IS#1 and IS#2) area counts were above the identified QC limits in analytical sequence MA11213. Internal standard IS#2 is associated with chromium and vanadium, while IS#1 is associated with antimony. In the analytical sequence MA11213, the area counts for IS#1 and IS #2 in JB52302-15 and JB52302-18 were identified as being outside QC limits on the QC summary report, exceeding the listed QC range of 60-125%. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Review of the data revealed that the area counts for IS#1 and IS#2 (ranging 125%-128%) in these two samples were actually within the updated QC limits of 70-130%. Thus, these samples did not warrant reanalysis and the results for chromium, vanadium, and antimony are considered acceptable. Consequently, the affected samples in MA11213 were not reanalyzed, as the IS area counts are considered acceptable by the laboratory. Consequently, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or field blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB52302.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike recoveries are summarized in Table 2 for the analytes and QC samples that recovered outside QC limits. The sample ID numbers that are associated with these affected QC batches are also listed at the bottom of the table.

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for QC samples in three of the four identified QC batches which are summarized in Table 2 below, the fourth being associated with the leachate analysis where the recoveries were acceptable. These excursive recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Additionally, the chromium, nickel and vanadium recoveries were below QC limits in MP26362, while the nickel and vanadium recoveries associated with the first three samples exhibited elevated spike recoveries. Following the DV review, the sample results subject to qualification for spike recoveries outside QC limits were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). Those nickel and vanadium results associated with high spike recoveries are flagged with "NJ+" for the potential positive bias. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26360 Ω	JB52302-1	Antimony	18.2 %	18.6 %	NJ-	Low
MP26360 Ω	JB52302-1	Nickel	129.5 %	82.3 %	NJ+	High
MP26360 Ω	JB52302-1	Vanadium	139.2 %	124.6 %	NJ+	High
MP26361 †	JB52302-4	Antimony	19.3 %	21.0 %	NJ-	Low

MP26362 ¥	JB52302-25	Antimony	32.4 %	33.6 %	NJ-	Low
MP26362 ¥	JB52302-25	Chromium	19.8 %	45.9 %	NJ-	Low
MP26362 ¥	JB52302-25	Nickel	68.8 %	67.0 %	NJ-	Low
MP26362 ¥	JB52302-25	Vanadium	69.2 %	75.5 %	NJ-	Low

QC Limits are 75-125%;

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.

MS – Matrix spike

MSD – Matrix spike duplicate.

Ω – The samples associated with QC Batch MP26360 consist of JB52302-1 through -3 (inclusive);

† – The samples associated with QC Batch MP26361 consist of JB52302-4 through -22 (inclusive), and JB52302-24.

¥ – The samples associated with QC Batch MP26362 consist of JB52302-23A, JB52302-25 and -26.

The antimony results in all of these affected samples are flagged with “NJ-” due to a potential low bias. The detected nickel and vanadium results in samples JB52302-1, -2, and -3 are flagged with “ENJ+” and “*ENJ+”, respectively, because the samples were associated with serial dilution results outside QC limits, while the duplicate result for vanadium in the QC sample was above QC limits in the QC sample associated with the three samples, as was the chromium duplicate result (“*EJ”). These qualified results are presented below in summary table, Table 7, together with the results qualified for the duplicate and serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The case narrative identified the RPD values in the duplicate analysis as being above the QC limit for chromium, nickel, and antimony in QC Batch MP26360 due to possible sample non-homogeneity. However, the difference between the antimony concentrations in Sample JB52302-1 was less than two times the reporting limit (< 2 × CRQL) QC limit for technical data quality assessment in DV guidelines (USEPA, 2010), such that only the chromium and vanadium results associated with this QC batch are subject to qualification for analytical precision issues, as summarized in Table 3. All remaining %RPD values were below the QC limits of either 35%RPD or < 2 × CRQL for soil samples and, thus, no other results required qualification.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Duplicate Difference	DV Qualifier
MP26360 Ω	JB52302-1	Chromium	54.3 %RPD	*J
MP26360 Ω	JB52302-1	Vanadium	38.7 %RPD	*J

QC Limit is 35%RPD;

*J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction.

Ω – The samples associated with QC Batch MP26360 consist of JB52302-1 through -3 (inclusive).

Thus, following the DV review, the chromium and vanadium results associated with QC Batch MP26360 are qualified as estimated values and are to be flagged with “*J” due to the potential variability in the analytical precision as indicated in Table 3, due possibly to sample non-

homogeneity, though without exhibiting any clear bias direction. When the “*J” qualifiers are combined with the qualifiers associated with the elevated vanadium MS recovery and elevated serial dilution results for chromium and vanadium in the QC sample of this batch, the chromium results appear with “*EJ” and vanadium results appear with “*ENJ+” in the summary table, Table 7. Aside from the chromium and vanadium results in QC Batch MP26360, the remaining duplicate analyses demonstrated acceptable analytical precision.

The duplicate analysis was also performed on three pairs of spiked duplicate samples. All %RPD values were below the QC limit of 35%RPD, with values ranging 0.9-30.3%RPD for soil samples and no results required qualification. The spiked duplicate analyses demonstrated very good analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 91.5% - 108.0% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative stated that the RPDs for antimony, chromium, nickel and vanadium are outside QC limits in QC batches MP26360 and MP26361, and antimony, chromium and nickel in MP26362, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, closer review of the data revealed that only the antimony concentrations in each of the QC samples was < 50 times the IDL in this batch. Consequently, the chromium, nickel and vanadium results associated with QC batches MP26360 and MP26361, and chromium and nickel results associated with MP26362 were subject to qualification, as summarized in Table 4, for exceeding the QC limit of 10%D (not RPD as stated in the case narrative). The case narrative identified the serial dilution results being outside QC limits attributable to matrix interferences. Thus, the affected chromium, nickel and vanadium results in the samples associated with elevated %D values are subject to qualification to be flagged with “EJ” following the DV review, as discussed below. These QC results are summarized in Table 4 and detailed in Table 7 below.

Table 4. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26360 Ω	JB52302-1	Chromium	16.0 %D	EJ
MP26360 Ω	JB52302-1	Nickel	13.8 %D	EJ
MP26360 Ω	JB52302-1	Vanadium	12.1 %D	EJ
MP26361 †	JB52302-4	Chromium	22.3 %D	EJ
MP26361 †	JB52302-4	Nickel	22.5 %D	EJ
MP26361 †	JB52302-4	Vanadium	21.5 %D	EJ
MP26362 ¥	JB52302-25	Chromium	11.2 %D	EJ
MP26362 ¥	JB52302-25	Nickel	13.6 %D	EJ
Note –				
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.				
Ω – The samples associated with QC Batch MP26360 consist of JB52302-1 through -3 (inclusive);				
† – The samples associated with QC Batch MP26361 consist of JB52302-4 through -22 (inclusive), and JB52302-24.				
¥ – The samples associated with QC Batch MP26362 consist of JB52302-23A,				

The associated chromium, nickel and vanadium results in samples with laboratory sample ID numbers ranging JB52302-1 through -3, inclusive, are qualified as estimated values and flagged with “*EJ”, “ENJ+” and “*ENJ+”, respectively, to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The chromium, nickel and vanadium results in samples JB52302-4 through -22, and JB52302-24 are each flagged with “EJ”, while the chromium and nickel results of JB52302-25 and -26 are flagged with “ENJ-”. The individual qualified results are presented in the summary table, Table 7, along with the results qualified for matrix spike recoveries and analytical duplicate results outside QC limits.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

Two sets of field duplicate samples were collected as part of SDG JB52302. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2012), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the two pairs of field duplicate samples are presented in Table 5, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar in the two pairs of samples analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 44 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all analyte pairs, except for the nickel results for the field duplicates from DD012 5.5-6. Soil sample non-homogeneity may have contributed to the observed disparities.

Table 5. Comparison of Field Duplicate Soil Sample Results – SDG JB52302

Analyte	DD011 1.5-2 (mg/Kg)	DUP 16 (mg/Kg)	% RPD	DV Flag
Antimony	< 2.1 NJ-	< 0.96 NJ-	< 2 × CRQL	-
Chromium	41.6 EJ	37.8 EJ	9.6 %	-
Nickel	38.5 EJ	38.5 EJ	0 %	-
Thallium	< 1.0	< 0.48	< 2 × CRQL	-
Vanadium	26.5 EJ	20.8 EJ	24.1 %	-
Analyte	DD012 5.5-6 (mg/Kg)	DUP 17 (mg/Kg)	% RPD	DV Flag
Antimony	< 2.2 NJ-	< 3.5 NJ-	< 2 × CRQL	-
Chromium	19.0 EJ	29.6 EJ	43.6 %	-
Nickel	36.5 EJ	18.4 EJ	65.9 %	(J)
Thallium	< 1.1	< 1.7	< 2 × CRQL	-
Vanadium	18.9 EJ	27.5 EJ	37.1 %	-
<p>< – The analyte was not detected at the stated reporting limit; J – The reported result is an estimated value; NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;</p>				

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
 (J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy;
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
 < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

Consequently, due to the disparity in the nickel results for the field duplicate samples DD012 5.5-6 and DUP 17, these results are subject to qualification and are to be flagged with “J”, as indicated in Table 5 above. However, the nickel results from these two field duplicates are already qualified and flagged with “EJ”. Consequently, these affected sample results were not further flagged with an additional “J” in an effort to avoid redundancy in the applied qualifiers. Otherwise, the field duplicate results for the field duplicate samples from DD011 1.5-2 and DD012 5.5-6 demonstrated very good sampling representativeness and precision, with results generally less than 25%RPD.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported antimony results:

$$\text{Antimony (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The antimony concentration for Sample ED005 4-4.5 (JB52302-24) was listed as 67.4 mg/Kg on the reporting form and 1.425 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Antimony (mg/Kg)} &= \frac{(1.425 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.24 \text{ g})(85.2/100\%)} = \frac{71,250}{1,056.48} = 67.4409 \mu\text{g/g} \\ &= 67.4 \text{ mg/Kg, dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the antimony concentration of 67.4 mg/Kg for Sample ED005 4-4.5 was correctly reported.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 15 of the 26 soil samples that had been diluted by a factor of either two, four, or ten.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where one sample was diluted by a factor of 10x, thereby raising the reporting limit for the antimony and thallium results above the respective SRS criteria, as presented below in Table 6, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 6. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
ED007 8-8.5	JB52302-8	Antimony	< 1.2	10	< 12 NJ-	6
ED007 8-8.5	JB52302-8	Thallium	< 0.58	10	< 5.8	3

Units – mg/Kg
 < - The analyte was analyzed for, but was not detected above the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

The other analyte results associated with the non-detect soil results of antimony and thallium in JB52302-8 were all below the respective SRS values, including the non-detect (< 0.52 mg/Kg) Cr+6 result, thereby suggesting a reasonably “clean” sample.

The interpretation of the antimony (< 12 mg/Kg) and thallium result (<5.8) in JB52302-8 was not significantly compromised by the applied dilution, because review of the data indicated the reason for the raising of the reporting limit was attributable to analyst judgement in including a safety factor to compensate for the presence of some interference in the sample data, rather than the presence of the respective analyte concentrations. Since the other target analytes in the sample were considerably below their respective SRS values, it is likely that the raw amounts of antimony and thallium were similarly not elevated.

Summary

The soil sample analytical results for the samples of SDG JB52302 were found to be compliant with the analytical methods for the analysis of metals in the twenty-six soil samples and two field blanks using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries, differences in the duplicate analysis and the serial dilution analysis, as summarized in Tables 2, 3, and 4. The associated sample results are qualified accordingly and listed in Table 7 below.

Table 7. Summary Qualified Sample Metals Results in SDG JB52302

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD009 0.5-1	JB52302-1	Antimony	< 1.9	NJ-
DD009 0.5-1	JB52302-1	Chromium	110	*EJ
DD009 0.5-1	JB52302-1	Nickel	35.3	ENJ+
DD009 0.5-1	JB52302-1	Vanadium	34.4	*ENJ+
DD009 2-2.5	JB52302-2	Antimony	< 2.3	NJ-
DD009 2-2.5	JB52302-2	Chromium	77.9	*EJ
DD009 2-2.5	JB52302-2	Nickel	24.1	ENJ+
DD009 2-2.5	JB52302-2	Vanadium	22.1	*ENJ+
DD009 4-4.5	JB52302-3	Antimony	< 3.9	NJ-
DD009 4-4.5	JB52302-3	Chromium	82.3	*EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD009 4-4.5	JB52302-3	Nickel	18.4	ENJ+
DD009 4-4.5	JB52302-3	Vanadium	38.6	*ENJ+
ED007 0.5-1	JB52302-4	Antimony	< 1.9	NJ-
ED007 0.5-1	JB52302-4	Chromium	56.7	EJ
ED007 0.5-1	JB52302-4	Nickel	38.4	EJ
ED007 0.5-1	JB52302-4	Vanadium	24.1	EJ
ED007 2-2.5	JB52302-5	Antimony	< 2.1	NJ-
ED007 2-2.5	JB52302-5	Chromium	57.3	EJ
ED007 2-2.5	JB52302-5	Nickel	36.4	EJ
ED007 2-2.5	JB52302-5	Vanadium	22.7	EJ
ED007 4-4.5	JB52302-6	Antimony	< 1.0	NJ-
ED007 4-4.5	JB52302-6	Chromium	18.3	EJ
ED007 4-4.5	JB52302-6	Nickel	74.1	EJ
ED007 4-4.5	JB52302-6	Vanadium	18.0	EJ
ED007 6-6.5	JB52302-7	Antimony	1.5	NJ-
ED007 6-6.5	JB52302-7	Chromium	95.8	EJ
ED007 6-6.5	JB52302-7	Nickel	16.3	EJ
ED007 6-6.5	JB52302-7	Vanadium	23.6	EJ
ED007 8-8.5	JB52302-8	Antimony	<12	NJ-
ED007 8-8.5	JB52302-8	Chromium	28.9	EJ
ED007 8-8.5	JB52302-8	Nickel	29.8	EJ
ED007 8-8.5	JB52302-8	Vanadium	41.6	EJ
DUP 16	JB52302-9	Antimony	< 0.96	NJ-
DUP 16	JB52302-9	Chromium	37.8	EJ
DUP 16	JB52302-9	Nickel	38.5	EJ
DUP 16	JB52302-9	Vanadium	20.8	EJ
DD011 1.5-2	JB52302-10	Antimony	< 2.1	NJ-
DD011 1.5-2	JB52302-10	Chromium	41.6	EJ
DD011 1.5-2	JB52302-10	Nickel	38.5	EJ
DD011 1.5-2	JB52302-10	Vanadium	26.5	EJ
DD011 2.5-3	JB52302-11	Antimony	< 1.0	NJ-
DD011 2.5-3	JB52302-11	Chromium	24.5	EJ
DD011 2.5-3	JB52302-11	Nickel	353	EJ
DD011 2.5-3	JB52302-11	Vanadium	13.9	EJ
DD011 3.5-4	JB52302-12	Antimony	< 1.1	NJ-
DD011 3.5-4	JB52302-12	Chromium	14.4	EJ
DD011 3.5-4	JB52302-12	Nickel	28.6	EJ
DD011 3.5-4	JB52302-12	Vanadium	15.0	EJ
DD011 4.5-5	JB52302-13	Antimony	< 1.2	NJ-
DD011 4.5-5	JB52302-13	Chromium	14.2	EJ
DD011 4.5-5	JB52302-13	Nickel	21.8	EJ
DD011 4.5-5	JB52302-13	Vanadium	15.2	EJ
DD011 5.5-6	JB52302-14	Antimony	< 1.0	NJ-
DD011 5.5-6	JB52302-14	Chromium	17.3	EJ
DD011 5.5-6	JB52302-14	Nickel	32.1	EJ
DD011 5.5-6	JB52302-14	Vanadium	14.6	EJ
DD012 1.5-2	JB52302-15	Antimony	1.9	NJ-
DD012 1.5-2	JB52302-15	Chromium	129	EJ
DD012 1.5-2	JB52302-15	Nickel	43.2	EJ
DD012 1.5-2	JB52302-15	Vanadium	19.1	EJ
DD012 2.5-3	JB52302-16	Antimony	1.5	NJ-
DD012 2.5-3	JB52302-16	Chromium	172	EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD012 2.5-3	JB52302-16	Nickel	41.9	EJ
DD012 2.5-3	JB52302-16	Vanadium	12.3	EJ
DD012 3.5-4	JB52302-17	Antimony	< 2.0	NJ-
DD012 3.5-4	JB52302-17	Chromium	14.5	EJ
DD012 3.5-4	JB52302-17	Nickel	37.6	EJ
DD012 3.5-4	JB52302-17	Vanadium	18.1	EJ
DD012 4.5-5	JB52302-18	Antimony	< 0.98	NJ-
DD012 4.5-5	JB52302-18	Chromium	13.6	EJ
DD012 4.5-5	JB52302-18	Nickel	29.6	EJ
DD012 4.5-5	JB52302-18	Vanadium	13.9	EJ
DD012 5.5-6	JB52302-19	Antimony	< 2.2	NJ-
DD012 5.5-6	JB52302-19	Chromium	19.0	EJ
DD012 5.5-6	JB52302-19	Nickel	36.5	EJ
DD012 5.5-6	JB52302-19	Vanadium	18.9	EJ
DUP 17	JB52302-20	Antimony	< 3.5	NJ-
DUP 17	JB52302-20	Chromium	29.6	EJ
DUP 17	JB52302-20	Nickel	18.4	EJ
DUP 17	JB52302-20	Vanadium	27.5	EJ
ED005 0.5-1	JB52302-21	Antimony	< 2.2	NJ-
ED005 0.5-1	JB52302-21	Chromium	37.5	EJ
ED005 0.5-1	JB52302-21	Nickel	30.4	EJ
ED005 0.5-1	JB52302-21	Vanadium	22.0	EJ
ED005 2-2.5	JB52302-22	Antimony	< 4.3	NJ-
ED005 2-2.5	JB52302-22	Chromium	77.7	EJ
ED005 2-2.5	JB52302-22	Nickel	14.7	EJ
ED005 2-2.5	JB52302-22	Vanadium	28.7	EJ
ED005 3.5-4	JB52302-23A	Antimony	< 3.6	NJ-
ED005 4-4.5	JB52302-24	Antimony	67.4	NJ-
ED005 4-4.5	JB52302-24	Chromium	61.1	EJ
ED005 4-4.5	JB52302-24	Nickel	23.1	EJ
ED005 4-4.5	JB52302-24	Vanadium	28.1	EJ
ED005 6-6.5	JB52302-25	Antimony	< 2.1	NJ-
ED005 6-6.5	JB52302-25	Chromium	32.3	ENJ-
ED005 6-6.5	JB52302-25	Nickel	20.8	ENJ-
ED005 6-6.5	JB52302-25	Vanadium	27.0	NJ-
ED005 8-8.5	JB52302-26	Antimony	4.2	NJ-
ED005 8-8.5	JB52302-26	Chromium	237	ENJ-
ED005 8-8.5	JB52302-26	Nickel	49.6	ENJ-
ED005 8-8.5	JB52302-26	Vanadium	44.4	NJ-

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- J – The reported result is an estimated value;
- NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;
- NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high;
- * – Duplicate analysis not within control limits; indeterminate bias direction.
- EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review. The QC results associated with the SPLP leachate and field blank

analyses were all within control limits, such that the associated antimony leachate sample result and field blank results did not require qualification.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one QC batch for Field Blank samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

Hexavalent chromium was detected in 16 of 25 soil samples analyzed for Cr+6 in SDG JB52302. Concentrations of Cr+6 results had exceeded the SRS of 20 mg/Kg in only one (1) soil sample.

Case Narrative

The case narrative indicated that the QC requirements were met for issues such as holding time and method blanks. However, the soluble matrix spike recovery in QC Batch GP75946 was below the QC limits. Good insoluble MS and post spike (96.8%) recoveries were observed in this sample. In addition, the RPD value for the duplicate sample analysis was above the QC limits due to possible sample non-homogeneity. The MS recovery for a non-client aqueous sample associated with the two field blanks recovered below control limits. All other QC requirements were met for the associated samples.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.9998, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 90.3% to 94.6% for the two QC batches associated with the 26 soil samples and 99.9% to 101.4% for the one associated with the field blanks, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg or 0.010 mg/L), any of the continuing calibration blanks (< 0.010 mg/L), or the two field blanks. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post-spike recoveries that were within the 85-115% QC limits, as presented below in Table 8, except for the soluble MS recovery in QC Batch GP75946. Consequently, the hexavalent chromium results of samples JB52302-1 through -13 were subject to qualification required qualification based on the results of the MS recoveries.

Table 8. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP75946 £	JB52302-1	Cr ⁺⁶ , soluble	64.3 %	NJ-	Low
GP75946 £	JB52302-1	Cr ⁺⁶ , insoluble	82.3 %	----	----
GP75946 £	JB52302-1	Cr ⁺⁶ , post-spike	96.8 %	----	----
GP75948 Ж	JB52302-25	Cr ⁺⁶ , soluble	89.6 %	----	----
GP75948 Ж	JB52302-25	Cr ⁺⁶ , insoluble	95.7 %	----	----
GP75948 Ж	JB52302-25	Cr ⁺⁶ , post-spike	99.8 %	----	----
GN94565 €	JB52291-1	Cr ⁺⁶ soluble (aqueous)	73.3 %	NJ-	Low

QC Limits are 75-125% (soil) and 85-115% (aqueous) for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium
£ – The samples associated with QC Batch GP75946 consist of JB52302-1 through -13 (inclusive);
Ж – The samples associated with QC Batch GP75948 consist of JB52302-14 through -26 (inclusive);
€ – The samples associated with QC Batch GN94565 consist of JB52302-27 and -28.

Duplicate Sample Analysis

The duplicate analysis was performed on two sets of duplicate samples. The %RPD values for all QC batches were within the QC limits of 35%RPD for soil samples (USEPA, 2010; AECOM, 2010). Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

In soil and aqueous batches, the recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 84.9% to 100.0%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in any of the three analytical sequences. The hexavalent chromium method does not specify a serial dilution analysis requirement.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The results for the analysis of the two pairs of field duplicate samples are presented in Table 9, below:

Table 9. Comparison of Field Duplicate Soil Sample Results – SDG JB52302

Analyte	DD011 1.5-2 (mg/Kg)	DUP 16 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	1.3	0.66	< 2 × CRQL	-
Analyte	DD012 5.5-6 (mg/Kg)	DUP17 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	< 0.50	0.48	< 2 × CRQL	-

QC Limit is ≤ 50 %RPD;
< – The analyte was not detected at the stated reporting limit;
J – The reported result is an estimated value;
CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;

< 2 × CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

The results for the hexavalent chromium concentrations in the field duplicate samples from DD011 1.5-2 and DD012 5.5-6 were similar and, thus, considered representative, as the concentrations between field duplicate samples differed by less than two times the reporting limit value (< 2 × CRQL). The hexavalent chromium results for the two pairs of field duplicate samples, therefore, demonstrate acceptable sampling representativeness and precision.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calibration curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample DD012 2.5-3 (JB52302-16) was listed as 23.3 mg/Kg on the reporting form and 0.5069 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.5069 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00253 \text{ Kg} \times 86.1/100} = \frac{0.05069}{0.002178} = 23.2736 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 23.3 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 23.3 mg/Kg for Sample DD012 2.5-3 was correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 25 soil samples analyzed for Cr+6 in this SDG, JB52302. Thus, this detected Cr⁺⁶ concentration was above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

Most samples were observed to fall below the Eh-pH phase diagram line. These results suggest that many of the samples experience conditions of reducing soil environment. Some of the samples (4 out of 26) fall on or slightly above the Eh-pH phase diagram line. These results

suggest that some of the samples may experience condition of an oxidizing soil environment. However, the reported Cr+6 results of the affected samples are considered acceptable because of two issues, the Cr+6 concentration of the samples in the oxidizing environment are low (<1.3 mg/Kg), while the Cr+6 results of the other samples in the reducing soil are not expected to increase in value because oxidation to Cr+6 is not favorable under reducing soil conditions. Thus, the hexavalent chromium results are considered acceptable as reported with only one hexavalent chromium concentration (23.3 mg/Kg) above the SRS of 20 mg/Kg, as detailed in the text above.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were below QC limits for the soluble matrix spikes associated with QC Batch GP75946 for soil samples JB52302-1 through -13 (inclusive) and GN94565 associated with the two field blanks (JB52302-27 and -28). All other QC results associated with the hexavalent chromium analysis were within QC limits. The Cr⁺⁶ results for the 13 soil samples of SDG JB52302 were qualified following the DV review and flagged with "NJ-", as were the two field blank results below in Table 10.

Table 10. Summary of Qualified Sample Cr⁺⁶ Results in SDG JB52302

Client ID	Laboratory Sample ID	Analyte	Result (mg/Kg)	DV Qualifier
DD009 0.5-1	JB52302-1	Cr ⁺⁶	11.3	NJ-
DD009 2-2.5	JB52302-2	Cr ⁺⁶	14.6	NJ-
DD009 4-4.5	JB52302-3	Cr ⁺⁶	8.7	NJ-
ED007 0.5-1	JB52302-4	Cr ⁺⁶	4.2	NJ-
ED007 2-2.5	JB52302-5	Cr ⁺⁶	1.8	NJ-
ED007 4-4.5	JB52302-6	Cr ⁺⁶	<0.47	NJ-
ED007 6-6.5	JB52302-7	Cr ⁺⁶	4.6	NJ-
ED007 8-8.5	JB52302-8	Cr ⁺⁶	<0.52	NJ-
DUPE 16	JB52302-9	Cr ⁺⁶	0.66	NJ-
DD011 1.5-2	JB52302-10	Cr ⁺⁶	1.3	NJ-
DD011 2.5-3	JB52302-11	Cr ⁺⁶	<0.49	NJ-
DD011 3.5-4	JB52302-12	Cr ⁺⁶	<0.47	NJ-
DD011 4.5-5	JB52302-13	Cr ⁺⁶	<0.49	NJ-
FB06	JB52302-27	Cr ⁺⁶	<0.010 mg/L	NJ-
FB07	JB52302-28	Cr ⁺⁶	<0.010 mg/L	NJ-

Key:
 < –The analyte was analyzed for, but was not detected above the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16*, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

US EPA, CLP, 2010, *"National Functional Guidelines for Inorganic Superfund Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOWILMO5.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 52302

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No

Indicate the identity of the samples and why. *Matrix interference.*
 (2x) JB 52302 - 1, 2, 4, 5, 10, 17, 19, 21, 25, 26.
 (4x) JB 52302 - 3, 20, 22, 23A.
 (10x) JB 52302 - 8.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

Antimony and thallium in JB 52302 - 8.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

*15 SRS values were exceeded.
 13 results for nickel in JB 52302 - 1, 4, 5, 6, 9, 10, 11, 14, 15
 one antimony in JB 52302 - 24; - 16, 17, 19, 26. Cr⁺⁶ in - 16.*

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

*Refer to DV report discussions of case narrative regarding QC limit exceedances.
 No problems with analytical procedures were noted.*

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 5, and 8 for details.

Qualified sample results are presented in Tables 7 and 10 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB52401A
Sample Date: November 6, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: March 26, 2014

This data validation (DV) report presents the data review and result qualifications for six (6) soil samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 6, 2013 for sample delivery group (SDG) JB52401A. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB52401A were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the six collected soil samples.

- Following the detailed DV review, there were no sample results that warranted qualification, based on the acceptability of the supporting QC data.

Thus, no sample results in SDG JB52401A required qualification, based on the acceptable associated QC results and analytical performance. Details are provided in the sections of text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for nickel, vanadium and hexavalent chromium in JB52401-12, and antimony in sample JB52401-14.

A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The six (6) soil samples collected November 6, 2013, were received November 7, 2013 at the Accutest laboratory in Dayton, NJ with an acceptable sampling cooler temperature of 1°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. intact and chemically preserved on November 7, 2013 with acceptable sampling cooler temperatures of 3.8°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary – SDG JB52401A

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ED001 0.5-1	JB52401-11	11/6/2013	Soil	Metals, Cr+6
ED001 2-2.5	JB52401-12	11/6/2013	Soil	Metals, Cr+6
ED001 4-4.5	JB52401-13	11/6/2013	Soil	Metals, Cr+6
ED001 6-6.5	JB52401-14	11/6/2013	Soil	Metals, Cr+6
ED001 8-8.5	JB52401-15	11/6/2013	Soil	Metals, Cr+6
DD005 0.5-1	JB52401-16	11/6/2013	Soil	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast Inc, in Orlando FL. Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB52401A, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (✓) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. The soil sample results exhibited concentrations below the respective site remediation standard (SRS) levels in the 6 soil samples of this SDG, except for the nickel and vanadium in JB52401-12, and antimony in JB52401-14.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS)/matrix spike duplicate (MSD) recoveries were outside QC limits for antimony in QC Batch MP26374 for a non-client sample FA10071-1, indicating possible matrix interference and/or sample non-homogeneity. However, the 75.7% MSD recovery for antimony is actually within the DV QC limits of 75-125% (NJDEP, 2002), while the MS recovery of 74.8% is at the lower control limit after rounding to two significant digits. The case narrative listed, in random order, the various analytes that experienced elevated reporting limits attributable to the dilution of samples during analysis due to matrix interference. No other issues were raised in the case narrative covering the metals analysis at the Orlando, Florida laboratory.

All other QC requirements were met, including analyses for hexavalent chromium, pH, oxidation reduction potential, and total solids analysis. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination).

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks or the continuing calibration blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB52401A.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis (QC Limits 75-125% Recovery; ≤ 35%RPD)

The 74.8% matrix spike and 75.7% matrix spike duplicate (MS/MSD) recoveries were identified as outside [laboratory] QC limits for the non-client QC sample (FA10071-1) in the one identified QC

batch for the six PPG soil samples, but were actually within the data validation QC limits of 75 - 125% when rounded to two significant digits (NJDEP, 2002). Since antimony was detected in three of the six PPG soil samples, the recovery at the low boundary of the QC limit range is judged to not significantly affect the interpretation of the associated antimony results. The one antimony result was above the SRS, even with the 75% spike recovery, indicates that the sample will require remediation or further evaluation. The next highest detected antimony result was 4.8 mg/Kg and it is not expected that there may exist any possible low bias that would significantly affect this concentration that would otherwise elevate it above the SRS value. Thus, professional judgement was applied in not qualifying the antimony results in the associated soil samples, since, additionally, this sample was from a client other than PPG.

Duplicate analysis (QC Limit \leq 35 %RPD)

The duplicate analysis was performed on a non-client QC sample with concentrations that were low, but not different from those observed in PPG soil samples. All %RPD values were below the QC limit of 35%RPD for soil samples, as well as the 20%RPD laboratory QC limit and no results required qualification. The duplicate analyses demonstrated acceptable analytical precision with all RPD values below 18.2%RPD, while the results of the matrix spiked duplicate samples were less than 3.5%RPD.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 94.8% - 105.0% for the soil sample metals analysis, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis (QC Limit \leq 10 %D)

The percent difference (%D) values in the serial dilution analysis were all below the QC limit of 10%D, ranging from 0 to 7.0 %D. Consequently, no soil sample results required qualification.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Antimony (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading ($\mu\text{g/L}$)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The antimony concentration for Sample ED001 6-6.5 (JB52401-14) was listed as 6.6 mg/Kg on the reporting form and 0.1371 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Antimony (mg/Kg)} = \frac{(137.1 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.30 \text{ g}) (79.4/100\%)} = \frac{6,855}{1,032.2} = 6.6412 \mu\text{g/g}$$

= 6.6 mg/Kg, dry weight

After rounding to two significant figures, this verifies that the antimony concentration of 6.6 mg/Kg for Sample ED001 6-6.5 was correctly reported. This concentration marginally exceeded the antimony SRS of 6 mg/Kg.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of five of the six soil samples for metals analysis that had been diluted by a factor of either two or four. However, following dilution, none of the reporting limits exceeded any of the SRS values for the target analytes.

Summary

The soil sample analytical results for the samples of SDG JB52401A were found to be compliant with the analytical methods for the analysis of metals in the six soil samples using SW-846 Method 6010C. The QC criteria were met for the metals target analyte analyses, such that no metals sample results warranted qualification following completion of the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the six soil samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in 5 of the 6 soil samples, with the 21.2 mg/Kg result in JB52401-14 above the SRS of 20 mg/Kg. No Cr+6 results required qualification in this SDG, JB52401A following the DV review.

Case Narrative

The case narrative indicated that all QC requirements were met, and that good recoveries were achieved for the matrix spike analyses. The RPD for Cr+6 was outside QC limits, but was acceptable due to low duplicate and sample concentrations.

Calibrations

The initial calibrations for the various Cr+6 analyses demonstrated an acceptable correlation coefficient with a value of 0.99989, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered between 93.6% and 97.7% for soil analyses, thereby meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in the method blanks (< 0.40 mg/Kg) or the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The soluble and insoluble matrix spike recoveries for hexavalent chromium, as well as the post-digestion spikes, were below the respective QC limits for the soil QC batch employing PPG sample JB52401-4, a sample from another PPG SDG, thereby demonstrating acceptable accuracy and no hexavalent chromium results were qualified following the DV review. The spike recoveries ranged 80.8 to 91.9%, well within QC limits.

Duplicate Sample Analysis

The duplicate analyses met QC requirements with values less than 1.6 %RPD, including redox potential and pH analyses, except for the 89.8 %RPD value for Cr+6 analysis in QC Batch GP75957. However, the result met QC limits because the difference between the duplicate results was less than two times the CRDL (or reporting limit), the QC limit for soil analysis (USEPA, 2010). Consequently, no sample results associated with this SDG, SDG JB52401A, are subject to qualification for analytical precision issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 92.5% to 99.1%, thereby demonstrating acceptable analytical system performance for the soil analyses.

Sample Result Verification

The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ED001 2-2.5 (JB52401-12) was listed as 21.1 mg/Kg on the reporting form and 0.4489 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Cr}^{+6} \text{ (mg/Kg)} &= \frac{A \times B \times E}{C \times D} \\ \text{Cr}^{+6} \text{ (mg/Kg)} &= \frac{0.4489 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00246 \text{ Kg} \times 85.9\%/100\%} = \frac{0.04489}{0.0021131} = 21.2437 \text{ mg/Kg} \end{aligned}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 21.2 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 21.2 mg/Kg for Sample ED001 2-2.5 was correctly reported. This was the highest detected Cr+6 concentration detected among the six soil samples of this SDG, JB52401A and the only result detected above the SRS of 20 mg/Kg in this SDG.

pH/Eh (ORP)

The pH and Eh (ORP) data were reviewed and determined to have acceptable QC results and are correctly reported on the sample "Report of Analysis" forms, which essentially serve as the "Form I" for reporting results.

The pH and Eh results were compared to the Eh-pH phase diagrams and verified that the sample points are correctly located on the diagrams. All sample results were observed to fall under the Eh-pH phase diagram line, thereby demonstrating "reducing" conditions. Hexavalent chromium was detected in five of the six soil samples of JB52401A at concentrations of 16.2 mg/Kg or less, except for the 21.2 mg/Kg Cr+6 result in Sample JB52401-12, which was the only Cr+6 result above the SRS of 20 mg/Kg.

Summary of Hexavalent Chromium Results in SDG JB52401A

The soil sample analytical results for the samples of SDG JB52401A met all QC requirements of the hexavalent chromium analyses, such that no sample Cr+6 results required qualification.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

US EPA, CLP, 2010, ***“National Functional Guidelines for Inorganic Superfund Data Review”***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13***, September 2006.

US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 52401 A

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

(2x) JB 52401 - 11, 14, 16

(4x) JB 52401 - 13, 15

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Nickel, vanadium and Cr⁺⁶ in JB 52401 - 12

Antimony in JB 52401 - 14.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No analytical procedural problems were noted

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No

Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report text for details.

No sample results warranted qualification.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB52631
Sample Date: November 8, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: February 7, 2014

This data validation (DV) report presents the data review and result qualifications for thirty-five (35) soil samples and one field blank (FB) collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 8, 2013 for sample delivery group (SDG) JB52631. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB52631 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 35 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony ("NJ-") in Samples JB52631-1 through -6 (inclusive), and JB52631-8 through -36 (inclusive);
- Chromium ("ENJ+") in Samples JB52631-1 through -6 (inclusive), and JB52631-8 through -21 (inclusive);
- Chromium ("ENJ-") in Samples JB52631-22 through -36 (inclusive);
- Nickel ("EJ") in Samples JB52631-1 through -6 (inclusive), and JB52631-8 through -36 (inclusive);
- Nickel ("NJ-") in Sample JB52631-7 (field blank);
- Vanadium ("EJ") in Samples JB52631-1 through -6 (inclusive), and JB52631-8 through -21 (inclusive);
- Vanadium ("*ENJ-") in Samples JB52631-22 through -36 (inclusive).

No other sample results in SDG JB52631 required qualification, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for five nickel results and one antimony result.

The sample results that were subject to qualification following the DV review are presented in Table 6 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The thirty-five (35) soil samples and one field blank collected November 8, 2013, were received the same day at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 5°C, a temperature below the 10 °C criterion above which some DV guidelines recommend qualification of associated samples, as well as below the 6 °C guideline for hexavalent chromium (NJDEP, 2005). The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. preserved and in good condition with on November 12, 2013 with sampling cooler temperatures of 3.3°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary – SDG JB52631

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ED003 8-8.5	JB52631-1	11/8/2013	Soil	Metals, Cr+6
ED004 0.5-1	JB52631-2	11/8/2013	Soil	Metals, Cr+6
ED004 2-2.5	JB52631-3	11/8/2013	Soil	Metals, Cr+6
ED004 4-4.5	JB52631-4	11/8/2013	Soil	Metals, Cr+6
ED004 6-6.5	JB52631-5	11/8/2013	Soil	Metals, Cr+6
ED004 8-8.5	JB52631-6	11/8/2013	Soil	Metals, Cr+6
FB08	JB52631-7	11/8/2013	Aqueous	Metals, Cr+6
ED006 0.5-1	JB52631-8	11/8/2013	Soil	Metals, Cr+6
ED006 5-5.5	JB52631-9	11/8/2013	Soil	Metals, Cr+6
ED006 7-7.5	JB52631-10	11/8/2013	Soil	Metals, Cr+6
ED006 9-9.5	JB52631-11	11/8/2013	Soil	Metals, Cr+6
ED00611-11.5	JB52631-12	11/8/2013	Soil	Metals, Cr+6
DD001 0.5-1	JB52631-13	11/8/2013	Soil	Metals, Cr+6
DD001 2-2.5	JB52631-14	11/8/2013	Soil	Metals, Cr+6
DD001 4-4.5	JB52631-15	11/8/2013	Soil	Metals, Cr+6
DD001 6-6.5	JB52631-16	11/8/2013	Soil	Metals, Cr+6
DD001 8-8.5	JB52631-17	11/8/2013	Soil	Metals, Cr+6
DD002 0.5-1	JB52631-18	11/8/2013	Soil	Metals, Cr+6
DD002 2-2.5	JB52631-19	11/8/2013	Soil	Metals, Cr+6
DD002 5-5.5	JB52631-20	11/8/2013	Soil	Metals, Cr+6
DD002 7-7.5	JB52631-21	11/8/2013	Soil	Metals, Cr+6
DD002 9-9.5	JB52631-22	11/8/2013	Soil	Metals, Cr+6
DD004 0.5-1	JB52631-23	11/8/2013	Soil	Metals, Cr+6
DD004 2-2.5	JB52631-24	11/8/2013	Soil	Metals, Cr+6
DD004 4-4.5	JB52631-25	11/8/2013	Soil	Metals, Cr+6
DD004 6-6.5	JB52631-26	11/8/2013	Soil	Metals, Cr+6
DD004 8-8.5	JB52631-27	11/8/2013	Soil	Metals, Cr+6
DD003 0.5-1	JB52631-28	11/8/2013	Soil	Metals, Cr+6
DD003 2-2.5	JB52631-29	11/8/2013	Soil	Metals, Cr+6
DD003 4-4.5	JB52631-30	11/8/2013	Soil	Metals, Cr+6
DD003 6-6.5	JB52631-31	11/8/2013	Soil	Metals, Cr+6
DD003 8-8.5	JB52631-32	11/8/2013	Soil	Metals, Cr+6
ED003 0.5-1	JB52631-33	11/8/2013	Soil	Metals, Cr+6
ED003 0.5-1	JB52631-33D	11/8/2013	Soil DUP/MSD	Metals, Cr+6
ED003 0.5-1	JB52631-33S	11/8/2013	Soil MS	Metals, Cr+6
ED003 2-2.5	JB52631-34	11/8/2013	Soil	Metals, Cr+6
ED003 4-4.5	JB52631-35	11/8/2013	Soil	Metals, Cr+6
ED003 6-6.5	JB52631-36	11/8/2013	Soil	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando, FL;
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB52631, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. The soil sample results

exhibited concentrations below the respective site remediation standard (SRS) levels in the 35 soil samples of this SDG, except for five nickel results and one antimony result.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) recoveries were outside QC limits for antimony, chromium, and vanadium in QC Batch MP26392, as was the matrix spike duplicate (MSD) recovery for antimony. However, the 79.9% MS recovery for vanadium is actually within the DV QC limits of 75-125% (NJDEP, 2002). The serial dilution results were outside QC limits for chromium, nickel, and vanadium in both soil QC batches, MP26392 and MP26393. The MS recoveries for antimony and chromium, and the MSD recoveries for antimony, chromium, nickel, and vanadium were identified as being outside QC limits in MP26393, although the 79.2% MSD recovery for nickel and the 122.3% chromium MS recovery were also within the DV QC limits. The case narrative identified the RPD values in the duplicate analysis as being above the QC limit for chromium, nickel, and vanadium in MP26393. However, the RPD values for chromium and nickel were below the 35%RPD DV QC limit for soil samples for chromium and nickel and, thus, were not subject to qualification following the DV review.

The case narrative also identified that the MS recovery for the QC batch (MP26380) associated with the field blank was outside QC limits.

All other QC requirements were met, including analyses for hexavalent chromium, pH, oxidation reduction potential, and total solids analysis. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits for the reported sample analyses, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except as noted in the discussion below.

There were some instances where the internal standard area counts were above the stated QC limits, including samples JB52631-13, -19 and JB52631-33 (analyzed as QC sample), and some of the associated QC samples (MS/MSD and the duplicate). However, based on control charts within the laboratory, the QC limit range has been updated to 70-130%. Consequently, the two of the affected samples in MA11222, JB52361-13 (127.2%) and JB52361-19 (125.8%) were not reanalyzed, as the IS area counts are below 130% and considered acceptable. The IS#1 (129%) and IS#2 (130.7%) of JB52631-33 were near the 130% upper calibration limit. Thus, the IS#1 for antimony was within the updated QC limits, while the IS#2 for JB52631 was still above QC limits. Consequently, the chromium and vanadium results for this sample are subject to qualification. However, since Sample JB52631-33 does not appear to have been reanalyzed, the chromium and vanadium results for JB52631-33 are subject to qualification. The chromium and vanadium in Sample JB52361-33 are qualified as estimated values and flagged with "ENJ-" and "*ENJ-", respectively, as are the results in the associated samples of the QC batch. Consequently, the chromium and vanadium results did not warrant additional flagging for the IS area count calibration issue.

The closing CRDL standard (CRIA4) recovery for antimony was 62%, a value below the DV QC limits of 70-130%. There was only one PPG sample analyzed in the affected sequence, JB53621-5. Since antimony was not detected in this sample that was diluted by a factor of 20, the reporting limit was above the affected range (true spike \pm CRQL) prior to adjustment for the dilution, such that the antimony result in JB53621-5 was not subject to qualification (USEPA, 2010). Furthermore, the analysis of a CRI standard is not a requirement of the analytical method.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB52631.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; \leq 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries were within the QC limits of 75 - 125% for QC samples in the three identified QC batches, except for those recoveries identified below in Table 2.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26392 Ω	JB52631-1	Antimony	30.9 %	26.2 %	NJ-	Low
MP26392 Ω	JB52631-1	Chromium	160.0 %	185.8%	NJ+	High
MP26392 Ω	JB52631-1	Vanadium	79.9 %	96.2 %	----	----
MP26393 \dagger	JB52631-33	Antimony	17.1 %	16.6 %	NJ-	Low
MP26393 \dagger	JB52631-33	Chromium	122.3 %	73.1 %	NJ-	Low
MP26393 \dagger	JB52631-33	Vanadium	87.8 %	74.5 %	NJ-	Low
MP26380 Θ	FA9783-1	Nickel	74.0 %	80.0 %	NJ-	Low

QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate.
 Ω – The samples associated with QC Batch MP26392 consist of JB52631-1 through -6, and JB52631-8 through -21 (inclusive);
 \dagger – The samples associated with QC Batch MP26393 consist of JB52631-22 through -36 (inclusive);
 Θ – The samples associated with QC Batch MP26380 consist of JB52631-7 (field blank).

The MS and MSD recoveries outside QC limits in Table 2 indicate possible matrix interference and/or possible sample non-homogeneity.

The antimony results in all of the 35 affected soil samples are flagged with “NJ-” due to a potential low bias, while the chromium results flagged with “NJ+” in samples associated with QC batch MP26392 may exhibit a potential positive bias in the identified samples. The chromium and

vanadium results flagged with "NJ-" in samples associated with QC batch MP26393 may exhibit a potential low bias in the identified samples. The field blank in QC Batch MP26380 was associated with non-client QC batch sample that experienced a MS recovery marginally below the QC limits of 75-125% (NJDEP, 2002). The nickel result in the field blank was qualified as an estimated value and flagged with "NJ-". These individual qualified sample results are presented below in summary table, Table 6, together with the sample results qualified for the duplicate analysis and serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The case narrative identified the RPD values in the duplicate analysis as being above the QC limit for chromium, nickel, and vanadium in MP26393 due to possible sample non-homogeneity. However, the RPD values for chromium and nickel were below the 35%RPD QC limit for technical data quality assessment in DV guidelines (USEPA, 2010), such that only the vanadium results associated with this QC batch are subject to qualification for analytical precision issues. Thus, the chromium and nickel results associated with MP26393 were not subject to qualification following the DV review. All remaining %RPD values were below the QC limits of either 35%RPD or < 2 × CRQL for soil samples and, thus, no other results required qualification.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
MP26393 †	JB52631-33	Vanadium	38.1 %D	*J
QC Limit is 35%RPD; *J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction. † – The samples associated with QC Batch MP26393 consist of JB52631-22 through -36 (inclusive).				

Thus, following the DV review, the vanadium results associated with QC Batch MP26393 are qualified as estimated values and are to be flagged with "*J" due to the potential variability in the analytical precision as indicated in Table 3, due possibly to sample non-homogeneity, though without exhibiting any clear bias direction. When the "*J" qualifiers are combined with the qualifiers associated with the low vanadium MSD recovery and elevated serial dilution result in the QC sample of this batch, the vanadium results appear with "*ENJ-" in the summary table, Table 6. Aside from the vanadium results in QC Batch MP26393, the remaining duplicate analyses demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 94.4% - 104.0% for the soil sample metals analysis, and 97.5 to 103.0% for the aqueous analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results being outside QC limits for chromium, nickel and vanadium in both QC batches and stated that the difference indicates matrix interferences. Thus, the affected chromium, nickel and vanadium results in the samples associated with these %D exceedances were subject to qualification following the DV review, as discussed below. These QC results are detailed in Table 4 below.

The case narrative also stated that the RPDs for antimony and thallium are outside QC limits in some QC batches, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010).

Table 4. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26392 Ω	JB52631-1	Chromium	18.2 %D	EJ
MP26392 Ω	JB52631-1	Nickel	19.0 %D	EJ
MP26392 Ω	JB52631-1	Vanadium	16.8 %D	EJ
MP26393 †	JB52631-33	Chromium	47.1 %D	EJ
MP26393 †	JB52631-33	Nickel	50.6 %D	EJ
MP26393 †	JB52631-33	Vanadium	45.3 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
 Ω – The samples associated with QC Batch MP26392 consist of JB52631-1 through -6, and JB52631-8 through -21 (inclusive);
 † – The samples associated with QC Batch MP26393 consist of JB52631-22 through -36 (inclusive).

The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers identified in Table 4 for the associated samples are qualified as estimated values and flagged with "EJ" to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 6, along with the results qualified for matrix spike recoveries outside QC limits and the duplicate analysis.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Antimony (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The antimony concentration for Sample ED003 4-4.5 (JB52631-35) was listed as 87.5 mg/Kg on the reporting form and 1.787 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Antimony (mg/Kg)} = \frac{(1,787 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.22 \text{ g})(83.5/100\%)} = \frac{89,150}{1,018.7} = 87.5135 \mu\text{g/g}$$

= 87.5 mg/Kg, dry weight

After rounding to three significant figures, this verifies that the antimony concentration of 87.5 mg/Kg for Sample ED003 4-4.5 was correctly reported. This concentration exceeded the antimony SRS of 6 mg/Kg.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 20 of the 35 soil samples that had been diluted by a factor of either two, four, five, ten, or 20.

The reporting limits for the target analytes determined for the ICP analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where four samples were diluted by a factor of 10×, while three samples were subjected to a 20× dilution, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 5, diluted apparently due to elevated levels of nickel in the samples, or due to appearance of the sample or digestate.

Table 5. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
ED004 6-6.5	JB52631-5	Antimony	< 0.95	20	< 19	6
ED004 6-6.5	JB52631-5	Thallium	< 0.48	20	< 9.6	3
DD001 6-6.5	JB52631-16	Antimony	< 0.8	20	< 16	6
DD001 6-6.5	JB52631-16	Thallium	< 0.4	20	< 7.9	3
DD001 8-8.5	JB52631-17	Antimony	< 0.7	20	< 14	6
DD001 8-8.5	JB52631-17	Thallium	< 0.34	20	< 6.9	3
DD002 5-5.5	JB52631-20	Antimony	< 1.1	10	< 11	6
DD002 5-5.5	JB52631-20	Thallium	< 0.56	10	< 5.6	3
DD004 8-8.5	JB52631-27	Antimony	< 0.8	10	< 8.0	6
DD004 8-8.5	JB52631-27	Thallium	< 0.4	10	< 4.0	3
DD003 8-8.5	JB52631-32	Antimony	< 0.86	10	< 8.6	6
DD003 8-8.5	JB52631-32	Thallium	< 0.43	10	< 4.3	3
ED003 2-2.5	JB52631-34	Antimony	< 0.78	10	< 7.8	6
E003 2-2.5	JB52631-34	Thallium	< 0.39	10	< 3.9	3

Units – mg/Kg

< - The analyte was analyzed for, but was not detected above the stated reporting limit.

Unlike other SDGs where the raised reporting limits of antimony and thallium were associated with samples exhibiting concentrations of other analytes that exceeded an SRS value, most of these samples were diluted seemingly because of sample/digestate appearance. Consequently, the samples identified in Table 6, except for JB52631-5 which exhibited a nickel result above its SRS of 31 mg/Kg, did not exhibit any results above an SRS value.

Summary

The soil sample analytical results for the samples of SDG JB52631 were found to be compliant with the analytical methods for the analysis of metals in the thirty-five soil samples and one field blank using SW-846 Method 6010C.

The QC criteria were met for the metals target analyte analyses, except for the low matrix spike recoveries for antimony in the two QC batches associated with 35 soil samples. Low MS and/or MSD recoveries were also observed for chromium and vanadium in samples associated with QC Batch MP26393 (samples JB52631-22 through -36), while the MS/MSD recoveries for chromium were above QC limits associated with samples JB52631-1 through -6 and JB52631-8 through -21 and are flagged with "NJ+" suggesting a potential positive bias. The nickel result in the field blank (FB 08) is qualified as an estimated value and flagged with "NJ-" due to the marginally low MS recovery in the associated QC sample.

The duplicate analysis for vanadium in QC Batch MP26393 was outside QC limits indicating potential variability in the analytical precision in associated samples (*J), possibly attributable to sample non-homogeneity.

The serial dilution result for chromium, nickel and vanadium in the QC samples of both QC batches associated with the 35 soil samples were above the QC limit of 10.0 %D, suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the identified chromium, nickel and vanadium results are qualified as estimated values and are flagged with "EJ" in 35 samples, as presented below in Table 6.

Table 6. Summary Qualified Sample Metals Results in SDG JB52631

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED003 8-8.5	JB52631-1	Antimony	1.7	NJ-
ED003 8-8.5	JB52631-1	Chromium	30.0	ENJ+
ED003 8-8.5	JB52631-1	Nickel	23.1	EJ
ED003 8-8.5	JB52631-1	Vanadium	24.5	EJ
ED004 0.5-1	JB52631-2	Antimony	< 3.7	NJ-
ED004 0.5-1	JB52631-2	Chromium	12.1	ENJ+
ED004 0.5-1	JB52631-2	Nickel	14.2	EJ
ED004 0.5-1	JB52631-2	Vanadium	16.1	EJ
ED004 2-2.5	JB52631-3	Antimony	< 5.4	NJ-
ED004 2-2.5	JB52631-3	Chromium	11.1	ENJ+
ED004 2-2.5	JB52631-3	Nickel	14.9	EJ
ED004 2-2.5	JB52631-3	Vanadium	17.2	EJ
ED004 4-4.5	JB52631-4	Antimony	< 0.80	NJ-
ED004 4-4.5	JB52631-4	Chromium	7.9	ENJ+
ED004 4-4.5	JB52631-4	Nickel	2.9	EJ
ED004 4-4.5	JB52631-4	Vanadium	8.0	EJ
ED004 6-6.5	JB52631-5	Antimony	< 19	NJ-
ED004 6-6.5	JB52631-5	Chromium	32.6	ENJ+
ED004 6-6.5	JB52631-5	Nickel	74.0	EJ
ED004 6-6.5	JB52631-5	Vanadium	50.1	EJ
ED004 8-8.5	JB52631-6	Antimony	< 1.8	NJ-
ED004 8-8.5	JB52631-6	Chromium	10.5	ENJ+
ED004 8-8.5	JB52631-6	Nickel	130	EJ
ED004 8-8.5	JB52631-6	Vanadium	13.9	EJ
FB08	JB52631-7	Nickel	< 40 ug/L	NJ-
ED006 0.5-1	JB52631-8	Antimony	< 1.5	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED006 0.5-1	JB52631-8	Chromium	10.2	ENJ+
ED006 0.5-1	JB52631-8	Nickel	24.8	EJ
ED006 0.5-1	JB52631-8	Vanadium	27.2	EJ
ED006 5-5.5	JB52631-9	Antimony	< 0.94	NJ-
ED006 5-5.5	JB52631-9	Chromium	31.0	ENJ+
ED006 5-5.5	JB52631-9	Nickel	63.4	EJ
ED006 5-5.5	JB52631-9	Vanadium	13.1	EJ
ED006 7-7.5	JB52631-10	Antimony	< 1.3	NJ-
ED006 7-7.5	JB52631-10	Chromium	12.2	ENJ+
ED006 7-7.5	JB52631-10	Nickel	19.7	EJ
ED006 7-7.5	JB52631-10	Vanadium	12.7	EJ
ED006 9-9.5	JB52631-11	Antimony	< 1.8	NJ-
ED006 9-9.5	JB52631-11	Chromium	44.2	ENJ+
ED006 9-9.5	JB52631-11	Nickel	333	EJ
ED006 9-9.5	JB52631-11	Vanadium	12.4	EJ
ED00611-11.5	JB52631-12	Antimony	< 1.2	NJ-
ED00611-11.5	JB52631-12	Chromium	13.6	ENJ+
ED00611-11.5	JB52631-12	Nickel	28.5	EJ
ED00611-11.5	JB52631-12	Vanadium	12.0	EJ
DD001 0.5-1	JB52631-13	Antimony	0.85	NJ-
DD001 0.5-1	JB52631-13	Chromium	34.3	ENJ+
DD001 0.5-1	JB52631-13	Nickel	13.3	EJ
DD001 0.5-1	JB52631-13	Vanadium	22.5	EJ
DD001 2-2.5	JB52631-14	Antimony	< 1.6	NJ-
DD001 2-2.5	JB52631-14	Chromium	8.1	ENJ+
DD001 2-2.5	JB52631-14	Nickel	13.9	EJ
DD001 2-2.5	JB52631-14	Vanadium	12.3	EJ
DD001 4-4.5	JB52631-15	Antimony	< 3.7	NJ-
DD001 4-4.5	JB52631-15	Chromium	8.9	ENJ+
DD001 4-4.5	JB52631-15	Nickel	10.9	EJ
DD001 4-4.5	JB52631-15	Vanadium	12.5	EJ
DD001 6-6.5	JB52631-16	Antimony	< 16	NJ-
DD001 6-6.5	JB52631-16	Chromium	11.2	ENJ+
DD001 6-6.5	JB52631-16	Nickel	< 32	EJ
DD001 6-6.5	JB52631-16	Vanadium	< 40	EJ
DD001 8-8.5	JB52631-17	Antimony	< 14	NJ-
DD001 8-8.5	JB52631-17	Chromium	12.7	ENJ+
DD001 8-8.5	JB52631-17	Nickel	< 28	EJ
DD001 8-8.5	JB52631-17	Vanadium	< 35	EJ
DD002 0.5-1	JB52631-18	Antimony	< 3.9	NJ-
DD002 0.5-1	JB52631-18	Chromium	70.3	ENJ+
DD002 0.5-1	JB52631-18	Nickel	14.4	EJ
DD002 0.5-1	JB52631-18	Vanadium	25.0	EJ
DD002 2-2.5	JB52631-19	Antimony	< 0.79	NJ-
DD002 2-2.5	JB52631-19	Chromium	17.9	ENJ+
DD002 2-2.5	JB52631-19	Nickel	12.1	EJ
DD002 2-2.5	JB52631-19	Vanadium	14.8	EJ
DD002 5-5.5	JB52631-20	Antimony	< 11	NJ-
DD002 5-5.5	JB52631-20	Chromium	29.2	ENJ+
DD002 5-5.5	JB52631-20	Nickel	< 22	EJ
DD002 5-5.5	JB52631-20	Vanadium	< 28	EJ
DD002 7-7.5	JB52631-21	Antimony	< 5.5	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
DD002 7-7.5	JB52631-21	Chromium	24.0	ENJ+
DD002 7-7.5	JB52631-21	Nickel	12.4	EJ
DD002 7-7.5	JB52631-21	Vanadium	19.3	EJ
DD002 9-9.5	JB52631-22	Antimony	< 4.3	NJ-
DD002 9-9.5	JB52631-22	Chromium	29.0	ENJ-
DD002 9-9.5	JB52631-22	Nickel	16.2	EJ
DD002 9-9.5	JB52631-22	Vanadium	20.1	*ENJ-
DD004 0.5-1	JB52631-23	Antimony	< 3.5	NJ-
DD004 0.5-1	JB52631-23	Chromium	256	ENJ-
DD004 0.5-1	JB52631-23	Nickel	32.5	EJ
DD004 0.5-1	JB52631-23	Vanadium	54.9	*ENJ-
DD004 2-2.5	JB52631-24	Antimony	< 4.6	NJ-
DD004 2-2.5	JB52631-24	Chromium	79.9	ENJ-
DD004 2-2.5	JB52631-24	Nickel	15.9	EJ
DD004 2-2.5	JB52631-24	Vanadium	23.1	*ENJ-
DD004 4-4.5	JB52631-25	Antimony	< 1.1	NJ-
DD004 4-4.5	JB52631-25	Chromium	20.9	ENJ-
DD004 4-4.5	JB52631-25	Nickel	9.9	EJ
DD004 4-4.5	JB52631-25	Vanadium	17.2	*ENJ-
DD004 6-6.5	JB52631-26	Antimony	< 0.96	NJ-
DD004 6-6.5	JB52631-26	Chromium	9.5	ENJ-
DD004 6-6.5	JB52631-26	Nickel	7.5	EJ
DD004 6-6.5	JB52631-26	Vanadium	8.7	*ENJ-
DD004 8-8.5	JB52631-27	Antimony	< 8.0	NJ-
DD004 8-8.5	JB52631-27	Chromium	12.4	ENJ-
DD004 8-8.5	JB52631-27	Nickel	< 16	EJ
DD004 8-8.5	JB52631-27	Vanadium	< 20	*ENJ-
DD003 0.5-1	JB52631-28	Antimony	< 1.8	NJ-
DD003 0.5-1	JB52631-28	Chromium	46.6	ENJ-
DD003 0.5-1	JB52631-28	Nickel	13.0	EJ
DD003 0.5-1	JB52631-28	Vanadium	22.1	*ENJ-
DD003 2-2.5	JB52631-29	Antimony	< 5.3	NJ-
DD003 2-2.5	JB52631-29	Chromium	13.3	ENJ-
DD003 2-2.5	JB52631-29	Nickel	17.1	EJ
DD003 2-2.5	JB52631-29	Vanadium	19.4	*ENJ-
DD003 4-4.5	JB52631-30	Antimony	< 0.76	NJ-
DD003 4-4.5	JB52631-30	Chromium	7.0	ENJ-
DD003 4-4.5	JB52631-30	Nickel	8.4	EJ
DD003 4-4.5	JB52631-30	Vanadium	12.9	*ENJ-
DD003 6-6.5	JB52631-31	Antimony	< 0.91	NJ-
DD003 6-6.5	JB52631-31	Chromium	11.4	ENJ-
DD003 6-6.5	JB52631-31	Nickel	7.7	EJ
DD003 6-6.5	JB52631-31	Vanadium	28.1	*ENJ-
DD003 8-8.5	JB52631-32	Antimony	< 8.6	NJ-
DD003 8-8.5	JB52631-32	Chromium	15.4	ENJ-
DD003 8-8.5	JB52631-32	Nickel	< 17	EJ
DD003 8-8.5	JB52631-32	Vanadium	< 22	*ENJ-
ED003 0.5-1	JB52631-33	Antimony	< 0.76	NJ-
ED003 0.5-1	JB52631-33	Chromium	13.6	ENJ-
ED003 0.5-1	JB52631-33	Nickel	19.0	EJ
ED003 0.5-1	JB52631-33	Vanadium	10.4	*ENJ-
ED003 2-2.5	JB52631-34	Antimony	< 7.8	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED003 2-2.5	JB52631-34	Chromium	13.2	ENJ-
ED003 2-2.5	JB52631-34	Nickel	< 16	EJ
ED003 2-2.5	JB52631-34	Vanadium	< 20	*ENJ-
ED003 4-4.5	JB52631-35	Antimony	87.5	NJ-
ED003 4-4.5	JB52631-35	Chromium	102	ENJ-
ED003 4-4.5	JB52631-35	Nickel	22.3	EJ
ED003 4-4.5	JB52631-35	Vanadium	12.3	*ENJ-
ED003 6-6.5	JB52631-36	Antimony	3.3	NJ-
ED003 6-6.5	JB52631-36	Chromium	70.1	ENJ-
ED003 6-6.5	JB52631-36	Nickel	19.7	EJ
ED003 6-6.5	JB52631-36	Vanadium	31.9	*ENJ-

Key:

< – The analyte was analyzed for, but was not detected above the stated reporting limit.

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.

*J – Duplicate analysis not within control limits; estimated value with an indeterminate bias direction.

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one batch for the field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in 18 of the 35 soil samples, but at reported concentrations below 4.7 mg/Kg, all values below the SRS of 20 mg/Kg. No Cr+6 results required qualification.

Case Narrative

The case narrative indicated that all QC requirements were met, and that good recoveries were achieved for the matrix spike analyses.

Calibrations

The initial calibrations for the various Cr+6 analyses demonstrated acceptable correlation coefficients with values of at least 0.99971, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered between 91.1% and 96.3% for soil

analyses and values of 99.1% for the FB analysis, thereby meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in the method blanks (< 0.40 mg/Kg), continuing calibration blanks or field blank (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The soluble and insoluble matrix spike recoveries for hexavalent chromium, as well as the post-digestion spikes, were below the respective QC limits for both soil QC batches, as well as the aqueous sample batch, thereby demonstrating acceptable accuracy and no hexavalent chromium results were qualified following the DV review. The spike recoveries ranged 87.9% to 107.3%, well within QC limits.

Duplicate Sample Analysis

All duplicate analyses met QC requirements with values less than 19.3 %RPD, including Cr+6, redox potential and pH analyses, except for the 27.0 %RPD value in QC Batch GP76039, a value still below the suggested 35%RPD QC limit for soil analysis (USEPA, 2010). Consequently, no sample results associated with this SDG, SDG JB52631, are subject to qualification for analytical precision issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 92.4% to 104.9%, thereby demonstrating acceptable analytical system performance for both the soil and aqueous analyses.

Sample Result Verification

The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample DD003 0.5-1 (JB52631-28) was listed as 4.7 mg/Kg on the reporting form and 0.1057 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.1057 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00258 \text{ Kg} \times 87.6\%/100\%} = 4.6772 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 4.7 \text{ mg/Kg}$$

After rounding to two significant figures, this verifies that the hexavalent chromium concentration of 4.7 mg/Kg for Sample DD003 0.5-1 was correctly reported. This was the highest detected Cr+6 concentration detected among the thirty-five soil samples of this SDG, JB52631. Thus, all Cr+6 results are under the SRS of 20 mg/Kg.

pH/Eh (ORP)

The pH and Eh (ORP) data were reviewed and determined to have acceptable QC results and are correctly reported on the sample "Report of Analysis" forms, which essentially serve as the "Form I" for reporting results.

The pH and Eh results were compared to the Eh-pH phase diagrams and verified that the sample points are correctly located on the diagrams. All sample results were observed to fall under the Eh-pH phase diagram line, thereby demonstrating "reducing" conditions, except for JB52631-18 whose Cr+6 concentration was only 4.3 mg/Kg. Hexavalent chromium was detected in 18 of the 35 soil samples of JB52631 at concentrations of 4.7.0 mg/Kg or less, thus, were all below the SRS of 20 mg/Kg.

Summary of Hexavalent Chromium Results in SDG JB52631

The soil sample analytical results for the samples of SDG JB52631 met all QC requirements of the hexavalent chromium analyses, such that no sample Cr+6 results required qualification.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

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US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 52631

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? for metals analysis Yes No
Indicate the identity of the samples and why. Matrix interference

(2x) JB52631-6, 8, 14, 28; (4x) JB52631-15;
 (5x) JB52631-2, 3, 18, 21, 22, 23, 24, 29; (20x) JB52631-5, 16, 17.
 (10x) JB52631-20, 27, 32, 34.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

Antimony and thallium in JB 52631-5, 16, 17, 20, 27, 32, 34.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Five nickel results: JB 52631-5, 6, 9, 11, 23
 one antimony: JB 52631-35.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.
 No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
 Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
 If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
 Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, and 4, as well as a brief discussion regarding calibration results in the DV report.

Qualified sample results are presented in Table 6 of the data validation report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB53021
Sample Date: November 12 and 13, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewers: Faiza M. Botros
Janis V. Giga, Ph.D., REP 5554
Report Date: February 12, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-six (26) soil samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 12 and 13, 2013 for sample delivery group (SDG) JB53021. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53021 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 26 collected soil samples.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53021-1 through -26 (inclusive);
- Chromium (NJ-) in Samples JB53021-1 through -8 (inclusive), and JB53021-17 and -18;
- Chromium (EJ) in Samples JB53021-9 through -16, and JB53021-19 through -26 (inclusive);
- Nickel (ENJ-) in Samples JB53021-9 through -26 (inclusive);
- Vanadium (ENJ-) in Samples JB53021-9 through -26 (inclusive);
- Hexavalent Chromium (NJ-) in Samples JB53021-1 through JB53021-13 (inclusive).

No other sample results in SDG JB53021 required qualification. Details are provided in the tables and text below. All but one of the target metals (nickel in JB53021-14) were reported below the respective site remediation standard (SRS) limits, while six (6) hexavalent chromium results exceeded the SRS value of 20 mg/Kg.

The individual sample results that were qualified following the DV review are identified in Tables 6 and 9 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-six (26) soil samples collected on November 12 and 13, 2013, were received

November 13, 2013 at the Accutest laboratory in Dayton, NJ intact and chemically preserved with acceptable sampling cooler temperatures of 2°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. on November 16, 2013 in properly preserved and intact with sampling cooler temperatures of 3.4°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
LD007 4-4.5	JB53021-1	11/12/13	Soil	Metals, Cr ⁺⁶
LD007 5-5.5	JB53021-2	11/12/13	Soil	Metals, Cr ⁺⁶
LD007 6-6.5	JB53021-3	11/12/13	Soil	Metals, Cr ⁺⁶
LD007 7-7.5	JB53021-4	11/12/13	Soil	Metals, Cr ⁺⁶
LD007 8-8.5	JB53021-5	11/12/13	Soil	Metals, Cr ⁺⁶
GI003 5.5-6	JB53021-6	11/12/13	Soil	Metals, Cr ⁺⁶
GI003 6.5-7	JB53021-7	11/12/13	Soil	Metals, Cr ⁺⁶
GI003 7.5-8	JB53021-8	11/12/13	Soil	Metals, Cr ⁺⁶
GI003 8.5-9	JB53021-9	11/12/13	Soil	Metals, Cr ⁺⁶
GI003 9.5-10	JB53021-10	11/12/13	Soil	Metals, Cr ⁺⁶
GI002 5-5.5	JB53021-11	11/12/13	Soil	Metals, Cr ⁺⁶
GI002 6-6.5	JB53021-12	11/12/13	Soil	Metals, Cr ⁺⁶
GI002 7-7.5	JB53021-13	11/12/13	Soil	Metals, Cr ⁺⁶
GI002 8-8.5	JB53021-14	11/12/13	Soil	Metals, Cr ⁺⁶
GI002 9-9.5	JB53021-15	11/12/13	Soil	Metals, Cr ⁺⁶
ID010 0.5-1	JB53021-16	11/13/13	Soil	Metals, Cr ⁺⁶
ID010 2-2.5	JB53021-17	11/13/13	Soil	Metals, Cr ⁺⁶
ID010 4-4.5	JB53021-18	11/13/13	Soil	Metals, Cr ⁺⁶
ID010 6-6.5	JB53021-19	11/13/13	Soil	Metals, Cr ⁺⁶
ID010 8-8.5	JB53021-20	11/13/13	Soil	Metals, Cr ⁺⁶
DUP 17	JB53021-21	11/13/13	Soil	Metals, Cr ⁺⁶
LD006 5.5-6	JB53021-22	11/13/13	Soil	Metals, Cr ⁺⁶
LD006 6.5-7	JB53021-23	11/13/13	Soil	Metals, Cr ⁺⁶
LD006 7.5-8	JB53021-24	11/13/13	Soil	Metals, Cr ⁺⁶
LD006 8.5-9	JB53021-25	11/13/13	Soil	Metals, Cr ⁺⁶
LD006 9.5-10	JB53021-26	11/13/13	Soil	Metals, Cr ⁺⁶

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast in Orlando, FL.
 Cr⁺⁶ – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB53021, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgment, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. No sample results exhibited concentrations above the respective site remediation standard (SRS) levels in any of the 26 soil samples of this SDG, except for one nickel result in GI002 8-8.5.

Laboratory Case Narrative

The case narrative stated that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony, nickel, and vanadium were identified as being outside QC limits in QC batches MP26409 and antimony, chromium and vanadium in the MSD analysis of MP26410. The MS/MSD recoveries of antimony, chromium, nickel, thallium and vanadium were identified as being outside control limits in QC Batch MP26415. The case narrative identified the serial dilution results for chromium, nickel and vanadium as being outside QC limits in QC Batch MP26409 and MP26415. However, the initial chromium concentration in the QC sample of MP26415 was actually less than 50 times the IDL, and thus, not subject to qualification during the DV review. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There were, however, two exceptions.

The antimony recoveries in the closing "CRI" standards of analytical sequences MA11229 and MA11230 recovered slightly below the 70-130% control limits. One soil sample was associated with the first sequence, while eight undiluted samples were analyzed in MA11230. However, it was observed that the detected concentrations and reporting limits for the non-detect results were all above the "affected range" (true spike \pm CRQL) for each of the associated samples and, consequently, no sample antimony results are subject to qualification (USEPA, 2010). Thus, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks or the continuing calibration blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53201.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis (QC Limits 75-125% Recovery; \leq 35%RPD)

The case narrative stated that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony, nickel, and vanadium were identified as being outside QC limits in QC Batch MP26409 and antimony, chromium and vanadium in the MSD analysis of MP26410. The MS/MSD recoveries of antimony, chromium, nickel, thallium and vanadium were identified as being outside control limits in QC Batch MP26415. However, upon closer inspection of the data, it was learned that the MSD recovery for nickel in MP26409 and vanadium in the MSD analysis of MP26410 were actually within the 75-125% DV QC limits, as can be seen in Table 2 below, as were the MS/MSD recoveries for thallium in QC Batch MP26415.

The MS and MSD recoveries for the various analytes were outside QC limits of 75 - 125% for QC samples in the three identified QC batches which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26409 Ω	JB53021-9	Antimony	23.8 %	25.3 %	NJ-	Low
MP26409 Ω	JB53021-9	Nickel	73.7 %	75.2%	NJ-	Low
MP26409 Ω	JB53021-9	Vanadium	64.4 %	66.1 %	NJ-	Low
MP26410 †	JB53586-1	Antimony	25.6 %	24.5 %	NJ-	Low
MP26410 †	JB53586-1	Chromium	94.9 %	70.3 %	NJ-	Low
MP26415 ϕ	FA10005-8	Antimony	58.3 %	59.4 %	NJ-	Low
MP26415 ϕ	FA10005-8	Chromium	32.9 %	32.8 %	NJ-	Low
MP26415 ϕ	FA10005-8	Nickel	14.5 %	17.1 %	NJ-	Low
MP26415 ϕ	FA10005-8	Vanadium	55.6 %	56.4 %	NJ-	Low

QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate.
 Ω – The samples associated with QC Batch MP26409 consist of JB53021-9 through -16 (inclusive), and JB53021-19 through -26 (inclusive);
 † – The samples associated with QC Batch MP26410 consist of JB53021-1 through -8 (inclusive).
 ϕ – The samples associated with QC Batch MP26415 consist of JB53021-17 and -18.

The antimony results in all of these affected samples (JB53021-1 through -26) are qualified as estimated values and flagged with "NJ-" due to a potential low bias. The chromium results in JB53021-1 through -8, JB53021-17 and -18 are flagged with "NJ-", while the nickel and vanadium results in soil samples JB53021-9 through -26 (inclusive) are also qualified as estimated values and flagged "ENJ-" in conjunction with the serial dilution results that were above the 10%D QC limit. These qualified results are presented below in summary table, Table 6, together with the sample results qualified for serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on three samples analyzed in duplicate and three pairs of samples spiked duplicate samples. All %RPD values were below the QC limit of 35%RPD, with values ranging 0-21.3%RPD for soil samples and no results required qualification. The duplicate analyses demonstrated very good analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 92.0% - 104.0% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results for chromium, nickel and vanadium as being outside QC limits in QC Batch MP26409 and stated that the differences indicates matrix interferences, while the nickel and vanadium results were above the QC limit in MP26415. Thus, the affected chromium, nickel and vanadium results in the samples associated with this elevated %D values are subject to qualification following the DV review. These QC results are detailed in Table 3 below.

Table 3. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26409 Ω	JB53021-9	Chromium	28.7 %D	EJ
MP26409 Ω	JB53021-9	Nickel	26.7 %D	EJ
MP26409 Ω	JB53021-9	Vanadium	27.6 %D	EJ
MP26415 ϕ	FA10005-8	Nickel	33.2 %D	EJ
MP26415 ϕ	FA10005-8	Vanadium	30.5 %D	EJ

Note –
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26409 consist of JB53021-9 through -16 (inclusive), and JB53201-19 through -26 (inclusive);
ϕ – The samples associated with QC Batch MP26415 consist of JB53021-17 and -18.

The associated chromium, nickel and vanadium results in samples with laboratory sample ID numbers ranging JB53021-9 through -16, and JB53021-19 through -26, inclusive, are qualified as estimated values and flagged with “EJ” or “ENJ-” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The nickel and vanadium results in JB53021-17 and -18 are flagged with “ENJ-”. The individual qualified results are presented in the summary table, Table 6, along with the results qualified for matrix spike recoveries outside QC limits.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

One set of field duplicate samples was collected as part of SDG JB53021. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2012), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the one pair of field duplicate samples are presented in Table 4, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples from ID010 8-8.5 were very similar and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 30 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all analyte pairs.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB53021

Analyte	ID010 8-8.5 (mg/Kg)	DUP 17 (mg/Kg)	% RPD	DV Flag
Antimony	< 1.8 NJ-	< 2.0 NJ-	< 2 × CRQL	-
Chromium	10 EJ	12.1 EJ	19.0 %	-
Nickel	7.9 ENJ-	10.6 ENJ-	29.2 %	-
Thallium	< 0.90	< 2.0	< 2 × CRQL	-
Vanadium	14.9 ENJ-	19.1 ENJ-	24.7 %	-
<p>< – The analyte was not detected at the stated reporting limit; J – The reported result is an estimated value; NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low; EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction. CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit; < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.</p>				

The metals results for the pair of field duplicate samples, therefore, demonstrate excellent sampling representativeness and precision.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The nickel concentration for Sample GI002 8-8.5 (JB53021-14) was listed as 41.7 mg/Kg on the reporting form and 0.7834 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Nickel (mg/Kg)} &= \frac{(783.4 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.10 \text{ g})(85.4/100\%)} = \frac{39,170}{939} = 41.6968 \mu\text{g/g} \\ &= 41.7 \text{ mg/Kg, dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the nickel concentration of 41.7 mg/Kg for Sample GI002 8-8.5 was correctly reported. This was the only metals analyte result that exceeded an SRS value.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 17 of the 26 soil samples that had been diluted by a factor of either two, four, five, or ten.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where one sample was diluted by a factor of 10x, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 5, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 5. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result (mg/Kg)	Remediation Standard
LD006 9.5-10	JB53021-26	Antimony	< 1.0	10	< 10 NJ-	6
LD006 9.5-10	JB53021-26	Thallium	< 0.50	10	< 5.0	3
Units – mg/Kg						
< - The analyte was analyzed for, but was not detected above the stated reporting limit.						
NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.						

The other analyte results associated with the non-detect soil results of antimony and thallium in JB53021-26 were all below the respective SRS values, including the 0.46 mg/Kg Cr+6 result, thereby suggesting a reasonably “clean” sample.

The interpretation of the antimony (< 10 mg/Kg) and thallium result (<5.0) in JB53021-26 was not significantly compromised by the applied dilution, since the other target analytes in the sample were considerably below their respective SRS values, such that it is likely that the raw amounts of antimony and thallium were similarly not elevated.

Summary

The soil sample analytical results for the samples of SDG JB53021 were found to be compliant with the analytical methods for the analysis of metals in the twenty-six soil samples using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries, and differences in the serial dilution analysis, as summarized in Tables 2 and 3. The associated sample results are qualified accordingly and listed in Table 6 below. Sample analyte results are flagged with either “NJ-”, “EJ”, or “ENJ-”.

Table 6. Summary of Qualified Sample Metals Results in SDG JB53021

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
LD007 4-4.5	JB53021-1	Antimony	< 0.95	NJ-
LD007 4-4.5	JB53021-1	Chromium	23.7	NJ-
LD007 5-5.5	JB53021-2	Antimony	< 4.0	NJ-
LD007 5-5.5	JB53021-2	Chromium	43.9	NJ-
LD007 6-6.5	JB53021-3	Antimony	< 4.2	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
LD007 6-6.5	JB53021-3	Chromium	17.6	NJ-
LD007 7-7.5	JB53021-4	Antimony	< 3.9	NJ-
LD007 7-7.5	JB53021-4	Chromium	15.0	NJ-
LD007 8-8.5	JB53021-5	Antimony	< 4.1	NJ-
LD007 8-8.5	JB53021-5	Chromium	12.1	NJ-
GI003 5.5-6	JB53021-6	Antimony	< 3.5	NJ-
GI003 5.5-6	JB53021-6	Chromium	202	NJ-
GI003 6.5-7	JB53021-7	Antimony	< 3.8	NJ-
GI003 6.5-7	JB53021-7	Chromium	455	NJ-
GI003 7.5-8	JB53021-8	Antimony	< 4.0	NJ-
GI003 7.5-8	JB53021-8	Chromium	364	NJ-
GI003 8.5-9	JB53021-9	Antimony	2.6	NJ-
GI003 8.5-9	JB53021-9	Chromium	215	EJ
GI003 8.5-9	JB53021-9	Nickel	7.6	ENJ-
GI003 8.5-9	JB53021-9	Vanadium	16.5	ENJ-
GI003 9.5-10	JB53021-10	Antimony	< 1.3	NJ-
GI003 9.5-10	JB53021-10	Chromium	35.7	EJ
GI003 9.5-10	JB53021-10	Nickel	13.7	ENJ-
GI003 9.5-10	JB53021-10	Vanadium	15.2	ENJ-
GI002 5-5.5	JB53021-11	Antimony	2.1	NJ-
GI002 5-5.5	JB53021-11	Chromium	151	EJ
GI002 5-5.5	JB53021-11	Nickel	9.8	ENJ-
GI002 5-5.5	JB53021-11	Vanadium	17.6	ENJ-
GI002 6-6.5	JB53021-12	Antimony	< 1.0	NJ-
GI002 6-6.5	JB53021-12	Chromium	36.0	EJ
GI002 6-6.5	JB53021-12	Nickel	10.1	ENJ-
GI002 6-6.5	JB53021-12	Vanadium	17.5	ENJ-
GI002 7-7.5	JB53021-13	Antimony	< 2.2	NJ-
GI002 7-7.5	JB53021-13	Chromium	33.0	EJ
GI002 7-7.5	JB53021-13	Nickel	12.6	ENJ-
GI002 7-7.5	JB53021-13	Vanadium	22.2	ENJ-
GI002 8-8.5	JB53021-14	Antimony	1.6	NJ-
GI002 8-8.5	JB53021-14	Chromium	128	EJ
GI002 8-8.5	JB53021-14	Nickel	41.7	ENJ-
GI002 8-8.5	JB53021-14	Vanadium	62.2	ENJ-
GI002 9-9.5	JB53021-15	Antimony	1.2	NJ-
GI002 9-9.5	JB53021-15	Chromium	18.7	EJ
GI002 9-9.5	JB53021-15	Nickel	8.6	ENJ-
GI002 9-9.5	JB53021-15	Vanadium	21.6	ENJ-
ID010 0.5-1	JB53021-16	Antimony	1.1	NJ-
ID010 0.5-1	JB53021-16	Chromium	83.7	EJ
ID010 0.5-1	JB53021-16	Nickel	9.2	ENJ-
ID010 0.5-1	JB53021-16	Vanadium	17.3	ENJ-
ID010 2-2.5	JB53021-17	Antimony	< 4.5	NJ-
ID010 2-2.5	JB53021-17	Chromium	3.9	NJ-
ID010 2-2.5	JB53021-17	Nickel	< 8.9	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ID010 2-2.5	JB53021-17	Vanadium	17.7	ENJ-
ID010 4-4.5	JB53021-18	Antimony	< 5.5	NJ-
ID010 4-4.5	JB53021-18	Chromium	26.4	NJ-
ID010 4-4.5	JB53021-18	Nickel	< 11	ENJ-
ID010 4-4.5	JB53021-18	Vanadium	22.9	ENJ-
ID010 6-6.5	JB53021-19	Antimony	< 2.1	NJ-
ID010 6-6.5	JB53021-19	Chromium	18.7	EJ
ID010 6-6.5	JB53021-19	Nickel	17.0	ENJ-
ID010 6-6.5	JB53021-19	Vanadium	18.6	ENJ-
ID010 8-8.5	JB53021-20	Antimony	< 1.8	NJ-
ID010 8-8.5	JB53021-20	Chromium	10	EJ
ID010 8-8.5	JB53021-20	Nickel	7.9	ENJ-
ID010 8-8.5	JB53021-20	Vanadium	14.9	ENJ-
DUP 17	JB53021-21	Antimony	< 2.0	NJ-
DUP 17	JB53021-21	Chromium	12.1	EJ
DUP 17	JB53021-21	Nickel	10.6	ENJ-
DUP 17	JB53021-21	Vanadium	19.1	ENJ-
LD006 5.5-6	JB53021-22	Antimony	< 4.4	NJ-
LD006 5.5-6	JB53021-22	Chromium	417	EJ
LD006 5.5-6	JB53021-22	Nickel	24.9	ENJ-
LD006 5.5-6	JB53021-22	Vanadium	47.2	ENJ-
LD006 6.5-7	JB53021-23	Antimony	< 2.2	NJ-
LD006 6.5-7	JB53021-23	Chromium	15.7	EJ
LD006 6.5-7	JB53021-23	Nickel	15.1	ENJ-
LD006 6.5-7	JB53021-23	Vanadium	24.3	ENJ-
LD006 7.5-8	JB53021-24	Antimony	< 3.8	NJ-
LD006 7.5-8	JB53021-24	Chromium	15.6	EJ
LD006 7.5-8	JB53021-24	Nickel	20.5	ENJ-
LD006 7.5-8	JB53021-24	Vanadium	22.5	ENJ-
LD006 8.5-9	JB53021-25	Antimony	< 1.0	NJ-
LD006 8.5-9	JB53021-25	Chromium	16.9	EJ
LD006 8.5-9	JB53021-25	Nickel	8.9	ENJ-
LD006 8.5-9	JB53021-25	Vanadium	12.3	ENJ-
LD006 9.5-10	JB53021-26	Antimony	< 10	NJ-
LD006 9.5-10	JB53021-26	Chromium	21.2	EJ
LD006 9.5-10	JB53021-26	Nickel	21.3	ENJ-
LD006 9.5-10	JB53021-26	Vanadium	30.9	ENJ-

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

N J- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Field duplicate sample analysis |
| √ Quantitation checks | √ Data qualifiers |
| √ Data package completeness | |

Hexavalent chromium was detected in 23 of 26 soil samples analyzed in SDG JB53021. Cr⁺⁶ results had exceeded the SRS of 20 mg/Kg in six (6) soil samples.

Case Narrative

The case narrative indicated that the QC requirements were met for issues such as holding time and method blanks. However, the soluble matrix spike recovery in QC Batch GP76102 was below the QC limits. Good MS recoveries and post spike recovery (100%) were observed for this sample. However, the RPD value for the duplicate sample analysis was acceptable. All other QC requirements were met for the associated samples.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with value of 0.99990, value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 90.5% to 92.5% for the two QC batches associated with the 26 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All but one of the matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 7. Thus, hexavalent chromium results in soil samples associated with QC batch GP76102 required qualification based on the results of the MS recoveries due to potential low bias in the ability to recover Cr⁺⁶ in the associated sample matrix.

Table 7. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76102 £	JB53021-8	Cr ⁺⁶ , soluble	67.1 %	NJ-	low
GP76102 £	JB53021-8	Cr ⁺⁶ , insoluble	91.0 %	----	----

GP76102 £	JB53021-8	Cr ⁺⁶ , post-digestion spike	92.1 %	----	----
GP76103 Ж	JB53021-16	Cr ⁺⁶ , soluble	89.3 %	----	----
GP76103 Ж	JB53021-16	Cr ⁺⁶ , insoluble	88.7 %	----	----
GP76103 Ж	JB53021-16	Cr ⁺⁶ , post-digestion spike	100 %	----	----

QC Limits are 75-125% (soil) and 85-115% (aqueous) for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium
NJ- — The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
£ – The samples associated with QC Batch GP76102 consist of JB53021-1 through -13 (inclusive);
Ж – The samples associated with QC Batch GP76103 consist of JB53021-14 through -26 (inclusive).

Duplicate Sample Analysis

The duplicate analysis was performed on two sets of duplicate samples. The %RPD values for all QC batches were within the QC limits of 35%RPD for soil samples (USEPA, 2010; AECOM, 2010). Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 92.4% to 96.8%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in any of the two analytical sequences.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The results for the analysis of the one pair of field duplicate samples are presented in Table 8, below.

Table 8. Comparison of Field Duplicate Soil Sample Results – SDG JB53021

Analyte	ID010 8-8.5 (mg/Kg)	DUP 17 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	0.79	0.83	< 2 × CRQL	-

QC Limit is ≤ 50 %RPD;
CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
< 2 × CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

The results for the hexavalent chromium concentrations in the field duplicate samples from ID010 8-8.5 were very similar and, thus, considered representative, as the concentrations between field duplicate samples differed by less than two times the reporting limit value (< 2 × CRQL). Excellent sampling representativeness and precision was demonstrated by the pair of field duplicate soil samples from ID010 8-8.5.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids

during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample GI003 7.5-8 (JB53021-8) was listed as 167 mg/Kg on the reporting form and 0.3708 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.3708 \text{ mg/L} \times 0.1 \text{ L} \times 10}{0.00249 \text{ Kg} \times 89.1/100} = \frac{0.3708}{0.002218} = 167.178 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 167 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 167 mg/Kg for Sample GI003 7.5-8 was correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 26 soil samples of this SDG JB53021. Thus, this detected Cr⁺⁶ concentration result was above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

Most samples were observed to fall below the Eh-pH phase diagram line. These results suggest that many of the samples experience conditions of reducing soil environment. Some of the samples (3 out of 26) fall on or slightly above the Eh-pH phase diagram line. These results suggest that some of the samples may experience condition of an oxidizing soil environment. However, the reported Cr+6 results of the affected samples are considered acceptable because of two issues, the Cr+6 concentration of the samples in the oxidizing environment are below the SRS (20 mg/Kg) except for sample JB53021-16 (25.2 mg/Kg). The Cr+6 results of the other samples in the reducing soil are not expected to increase in value because oxidation to Cr+6 is not favorable under reducing soil conditions. Thus, the hexavalent chromium results are considered acceptable as reported with the highest hexavalent chromium concentration (167 mg/Kg) above the SRS of 20 mg/Kg, as detailed in the text above.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were below QC limits for the soluble matrix spikes, as all other QC results associated with the hexavalent chromium analysis were within QC limits. The Cr⁺⁶ results for the 13 samples of SDG JB53021 were qualified following the DV review and flagged with "NJ-".

Table 9. Summary of Qualified Sample Cr⁺⁶ Results in SDG JB53021

Client ID	Laboratory Sample ID	Analyte	JB53021 Result (mg/Kg)	DV Qualifier
LD007 4-4.5	JB53021-1	Cr ⁺⁶	8.9	NJ-
LD007 5-5.5	JB53021-2	Cr ⁺⁶	5.5	NJ-
LD007 6-6.5	JB53021-3	Cr ⁺⁶	3.2	NJ-
LD007 7-7.5	JB53021-4	Cr ⁺⁶	<0.45	NJ-
LD007 8-8.5	JB53021-5	Cr ⁺⁶	0.82	NJ-
GI003 5.5-6	JB53021-6	Cr ⁺⁶	124	NJ-
GI003 6.5-7	JB53021-7	Cr ⁺⁶	124	NJ-
GI003 7.5-8	JB53021-8	Cr ⁺⁶	167	NJ-
GI003 8.5-9	JB53021-9	Cr ⁺⁶	91.0	NJ-
GI003 9.5-10	JB53021-10	Cr ⁺⁶	<0.57	NJ-
GI002 5-5.5	JB53021-11	Cr ⁺⁶	85.4	NJ-
GI002 6-6.5	JB53021-12	Cr ⁺⁶	4.2	NJ-
GI002 7-7.5	JB53021-13	Cr ⁺⁶	15.4	NJ-
NJ- — The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.				

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

US EPA, CLP, 2010, ***“National Functional Guidelines for Inorganic Superfund Data Review”***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3, SOP HW-2, Revision 13***, September 2006.

US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53021

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No

Indicate the identity of the samples and why. *Matrix interference*
metals 2x JB 53021 - 7, 8, 13, 19, 20, 21, 22, 23.
 4x JB 53021 - 2, 3, 4, 5, 6, 17, 24
 5x JB 53021 - 18
 10x JB 53021 - 26 *Cr+6 (10x): JB 53021 - 6, 7, 8, 9, 11.*

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No

If "Yes", list the affected samples.
Antimony and thallium in JB 53021 - 26

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Nickel in JB 53021 - 14
Cr+6 in JB 53021 - 6, 7, 8, 9, 11, and 16.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.
No analytical procedures problems were noted.

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*

10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, and 7 for details.

Qualified sample results are presented in Tables 6 and 9 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB53174 and JB53174R.

Sample Date: November 14, 2013

Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97

Reviewer: Faiza M. Botros
Janis V. Giga, Ph.D., REP 5554

Report Date: February 27, 2014

This data validation (DV) report presents the data review and result qualifications for five soil samples and three (3) Field Blank aqueous samples collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 14, 2013 for sample delivery group (SDG) JB53174. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53174 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 5 collected soil samples and three Field Blank aqueous samples.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53174-4 through -8 (inclusive).
- Chromium (*J) in Samples JB53174-4 through -8 (inclusive);
- Hexavalent chromium (NJ-) in Samples JB53174-4 through -8 (inclusive);

No other sample results in SDG JB53174 required qualification for hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for two nickel results. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The five (5) soil and three (3) Field Blank samples collected on November 14, 2013, were received November 14, 2013 at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 2.3°C. The samples destined for metals analysis were received at the Orlando laboratory on November 19, 2013 properly preserved with a sampling cooler temperature of 3.4 °C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
ID008 0-0.5	JB53174-4	11/14/13	Soil	Metals, Cr ⁺⁶
ID008 2-2.5	JB53174-5	11/14/13	Soil	Metals, Cr ⁺⁶
ID008 4-4.5	JB53174-6	11/14/13	Soil	Metals, Cr ⁺⁶
ID008 6-6.5	JB53174-7	11/14/13	Soil	Metals, Cr ⁺⁶
ID008 8-8.5	JB53174-8	11/14/13	Soil	Metals, Cr ⁺⁶
FB 09	JB53174-1	11/14/13	Aqueous	Metals, Cr ⁺⁶
FB 10	JB53174-2	11/14/13	Aqueous	Metals, Cr ⁺⁶
FB 11	JB53174-3	11/14/13	Aqueous	Metals, Cr ⁺⁶
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast, Inc. in Orlando, FL. Cr ⁺⁶ – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB53174, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgment, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) *“National Functional Guidelines for Inorganic Data Review”*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006);
- *NJDEP Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data

collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. No sample results exhibited concentrations above the respective site remediation standard (SRS) levels in any of the five soil samples of this SDG, except for two nickel results.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in QC Batch MP26428. The case narrative identified the duplicate analysis results being outside QC limits in QC Batch MP26428 for chromium and vanadium, and stated that the differences were possibly due to sample non-homogeneity. However, review of the data indicated that the difference between the vanadium results was less than two times the reporting limit, thereby meeting QC limits. The case narrative also stated that the RPDs for the spiked duplicates were outside control limits. However, these results were below the 35%RPD DV QC limit and, therefore, not subject to qualification. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all inductively coupled plasma argon (ICP) analyzed samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There was one exception where the internal standard area count (IS#2) was above QC limits for JB53174-4.

The exception included the internal standard area counts for IS#2 which is associated with chromium and vanadium in analytical run MA11235 for Sample JB53174-4. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, the 126.3% result for JB53174-4 was all less than 127% and apparently, therefore, not reanalyzed, as the IS area counts are considered acceptable by the laboratory representatives.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks or the continuing calibration blanks at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53174.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for QC samples in the identified QC batch which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits in SDG JB53174

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26428 Ω	FA10297-1	Antimony	50.4 %	52.9 %	NJ-	Low
QC Limits are 75-125%; NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike MSD – Matrix spike duplicate. Ω – The samples associated with QC Batch MP26428 consist of JB53174-4 through -8 (inclusive).						

The antimony results in the affected samples are flagged with "NJ-" due to a potential low bias. These qualified results are presented below in summary table, Table 5.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The case narrative identified the duplicate analysis results being outside QC limits in QC Batch MP26428 for chromium and vanadium, and stated that the differences were possibly due to sample non-homogeneity. However, review of the data indicated that the difference between the vanadium results was less than two times the reporting limit, thereby meeting QC limits.

Consequently, only the chromium results associated with MP26428 were subject to qualification following the DV review. All remaining %RPD values were below the QC limits of either 35%RPD or $< 2 \times \text{CRQL}$ for soil samples and, thus, no other results required qualification.

Table 3. Duplicate Analysis Results Outside QC Limits in SDG JB53174

QC Batch	QC Sample	Analyte	Duplicate Difference	DV Qualifier
MP26428 Ω	FA10297-1	Chromium	37.7 %RPD	*J
QC Limit is 35%RPD; *J – The duplicate analysis result is outside QC limits and the reported sample value is estimated with an indeterminate bias direction. Ω – The samples associated with QC Batch MP26428 consist of JB53174-4 through -8 (inclusive).				

Thus, following the DV review, the chromium results associated with QC Batch MP26428 are qualified as estimated values and are to be flagged with “*J” due to the potential variability in the analytical precision as indicated in Table 3, due possibly to sample non-homogeneity, though without exhibiting any clear bias direction. The chromium results appear with “*J” in the summary table, Table 5. Aside from the chromium results in QC Batch MP26428, the remaining duplicate analyses demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 94.4% - 102.4% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit $\leq 10\%$ D)

The percent difference (%D) results of the serial dilution analysis for SDG JB53174 were all less than the QC limit of 10%D. Thus, no sample results were qualified for serial dilution issues.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported nickel results:

$$\text{Nickel (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times \text{TS}/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The nickel concentration for Sample ID008 0-0.5 (JB53174-4) was listed as 88.2 mg/Kg on the reporting form and 1.599 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Nickel (mg/Kg)} = \frac{(1,599 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.09 \text{ g})(83.2/100\%)} = 88.1954 \mu\text{g/g}$$

$$= 88.2 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the nickel concentration of 88.2 mg/Kg for Sample ID008 0-0.5 was correctly reported.

Reporting Limits

The case narrative did identify that there were various analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of two of the five soil samples that had been diluted by a factor of either two or ten.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards, except where one sample (JB53174-7) was diluted by a factor of 10x, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 4, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 4. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result (mg/Kg)	Remediation Standard
ID008 6-6.5	JB53174-7	Antimony	< 1.1	10	< 11 NJ-	6
ID008 6-6.5	JB53174-7	Thallium	< 0.53	10	< 5.3	3

Units – mg/Kg
 < - The analyte was analyzed for, but was not detected above the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

The other analyte results associated with the non-detect soil results of antimony and thallium in JB53174-7 were all well below the respective SRS values, including the 0.98 mg/Kg Cr+6 result, thereby suggesting a reasonably “clean” sample.

The interpretation of the antimony (< 11 mg/Kg) and thallium result (<5.3) in JB53174-7 was not significantly compromised by the applied dilution, since the other target analytes in the sample were considerably below their respective SRS values, such that it is likely that the raw amounts of antimony and thallium were similarly not elevated.

Summary

The soil sample analytical results for the samples of SDG JB53174 were found to be compliant with the analytical methods for the analysis of metals in the five soil samples and three field blanks using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries for antimony in the QC batch (MP26428) associated with five soil samples: JB53174-4 through -8. The antimony results in these samples are qualified as estimated values (flagged

“NJ-”) in the associated soil samples due to a potential low bias, as summarized below in Table 5.

The duplicate analysis result for chromium in the QC sample of QC Batch MP26428 was above the QC limit of 35 %RPD, suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the identified chromium results are qualified as estimated values and are flagged with “*J” in five samples, as presented below in Table 5.

Table 5. Summary of Qualified Sample Metals Results in SDG JB53174

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ID008 0-0.5	JB53174-4	Antimony	< 2.2	NJ-
ID008 0-0.5	JB53174-4	Chromium	69.6	*J
ID008 2-2.5	JB53174-5	Antimony	< 1.0	NJ-
ID008 2-2.5	JB53174-5	Chromium	12.0	*J
ID008 4-4.5	JB53174-6	Antimony	1.5	NJ-
ID008 4-4.5	JB53174-6	Chromium	151	*J
ID008 6-6.5	JB53174-7	Antimony	< 11	NJ-
ID008 6-6.5	JB53174-7	Chromium	29.4	*J
ID008 8-8.5	JB53174-8	Antimony	< 0.97	NJ-
ID008 8-8.5	JB53174-8	Chromium	20.2	*J

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

*J – Duplicate analysis not within control limits; the result is an estimated value with indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples and one QC batch for Field Blank samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in 2 of 5 soil samples analyzed in SDG JB53174. Cr⁺⁶ results were below the SRS of 20 mg/Kg in the three (3) soil samples with detected concentrations.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, and method blanks.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.9998, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 93.2% to 97.2% for the two QC batches associated with the 5 soil samples and three Field Blank aqueous samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg or 0.010 mg/L), any of the continuing calibration blanks (< 0.010 mg/L), or field blanks at the stated reporting limits. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike recovery for insoluble Cr⁺⁶ was within the QC limits of 75-125%, as well as post-spike recoveries that were within the 85-115% QC limits, as presented below in Table 6. However, the soluble matrix spike recovery for Cr⁺⁶ (64.6%) was below the QC limits. Thus, hexavalent chromium results in soil samples associated with the QC batch required qualification based on the result of the MS recovery due to a potential low bias in the ability to recover Cr⁺⁶ in the associated sample matrix.

Table 6. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76207 £	JB53174-7	Cr ⁺⁶ , soluble	64.6 %	NJ-	Low
GP76207 £	JB53174-7	Cr ⁺⁶ , insoluble	81.4 %	----	----
GP76207 £	JB53174-7	Cr ⁺⁶ , post-digestion spike	88.9 %	----	----

QC Limits are 75-125% (soil) for MS recovery; 85-115% for post spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium
£ – The samples associated with QC Batch GP76207 consist of JB53174-4 through -8 (inclusive).

Duplicate Sample Analysis

In soil, the 32.0%RPD result for the duplicate Cr⁺⁶ analyses was the highest result observed in the general chemistry set of duplicate analyses. This %RPD value was above the laboratory QC limit of 20%RPD. However, this %RPD value is acceptable due to low duplicate and sample concentrations. All other duplicate analyses met QC requirements including Cr⁺⁶, redox potential and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

In the QC batches associated with the soil and aqueous samples, the recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-

120% QC limits, with recoveries ranging 88.2% to 93.3%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in any of the two analytical sequences. Serial dilution analysis is not a requirement of the Cr+6 analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ID008 4-4.5 (JB53174-6) was listed as 5.7 mg/Kg on the reporting form and 0.1202 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.1202 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00241 \text{ Kg} \times 87.6/100} = \frac{0.01202}{0.00211} = 5.697 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 5.7 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 5.7 mg/Kg for Sample ID008 4-4.5 was correctly reported. This was the highest detected Cr⁺⁶ concentration among the 5 soil samples of this SDG, JB53174. Thus, this detected Cr⁺⁶ concentration result was still below the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

Most samples were observed to fall below the Eh-pH phase diagram line. These results suggest that most of the samples experience conditions of reducing soil environment. One of the five soil samples falls slightly above the Eh-pH phase diagram line. These results suggest that the one soil sample may experience condition of an "oxidizing" soil environment. However,

the reported Cr⁺⁶ results of the affected samples are considered acceptable because of two issues, the Cr⁺⁶ concentration of the samples in the oxidizing environment are below the SRS (20 mg/Kg) and the Cr+6 results of the other samples in the reducing soil are not expected to increase in value because oxidation to Cr⁺⁶ is not favorable under “reducing” soil conditions. Thus, the hexavalent chromium results are considered acceptable as reported, with the highest hexavalent chromium concentration (5.7 mg/Kg) being below the SRS of 20 mg/Kg, as detailed in the text above.

Summary for Hexavalent Chromium Analysis SDG JB53174

Since the MS recovery for the soluble matrix spike was below QC limits, while the other QC results associated with the hexavalent chromium analysis were within the QC limits, the Cr⁺⁶ results of the 5 soil samples of SDG53174 were qualified following the DV review and flagged with “NJ-“. Consequently, the soil samples of the QC batch GP76207 required re-analysis and the resultant data review is presented in the section below labeled “SDG JB53174R”.

SDG JB53174R

Because the soluble MS recovery was below QC limits in the initial analysis of QC batch GP76207, the associated samples required reanalysis where the resultant data for the batch of samples (JB53174-4R through -8R) are summarized in this section.

All QC requirements were met during the reanalysis of samples JB53174-4R through -8R, including calibrations, QC blanks and the matrix spike recoveries. The %RPD for the duplicate analysis of 24.7% was above the laboratory QC limits of 20%. However, this RPD value was considered acceptable due to the low initial sample and duplicate sample concentrations, whose difference was less than the QC limit of “less than two times the CRQL, or reporting limit”.

Matrix Spike Analysis

The following matrix spike recoveries were observed during the reanalysis of the affected samples. However, upon reanalysis, improved MS recoveries were observed, particularly in the soluble spike. The insoluble MS recovery was again within the QC limits of 75-125%, while the post-spike recovery was also within the 85-115% QC limits, as presented below in Table 7.

Table 7. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76536 £	JB53174-7R	Cr ⁺⁶ , soluble	76.4 %	----	----
GP76536 £	JB53174-7R	Cr ⁺⁶ , insoluble	82.2%	----	----
GP76536 £	JB53174-7R	Cr ⁺⁶ , post spike	90 %	----	----
QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery MS – Matrix spike Cr ⁺⁶ – Hexavalent chromium £ – The samples associated with QC Batch GP76536 consist of JB53174-4R through -8R (inclusive).					

Since the soluble and insoluble MS recoveries in QC Batch GP76536 are within the QC limits (75-125%), the Cr⁺⁶ results of the samples of this QC batch are not subject to qualification. No sample results for Cr⁺⁶ had exceeded the SRS value of 20 mg/Kg in the reanalysis.

Summary for Hexavalent Chromium Analysis

The soil sample results from the initial analysis are presented alongside those obtained from the reanalysis of samples in SDG JB53174 below in Table 8. The Cr+6 results of the reanalysis appear to be comparable to those of the initial analysis, whose samples were associated with a low soluble MS recovery in the initial analysis and possibly suggesting a potential low bias in the ability to recover this analyte in the given sample matrix. The MS recoveries in the reanalysis were acceptable, being within QC limits.

Table 8. Comparison of Qualified Sample Cr⁺⁶ Results in SDGs JB53174 and JB53174R

Client ID	Lab Sample ID	Analyte	JB53174 Result (mg/Kg)	DV Qualifier	JB53174R Result (mg/Kg)	DV Qualifier
ID008 0-0.5	JB53174-4	Cr ⁺⁶	< 0.48	NJ-	< 0.48	----
ID008 2-2.5	JB53174-5	Cr ⁺⁶	< 0.44	NJ-	0.55	----
ID008 4-4.5	JB53174-6	Cr ⁺⁶	5.7	NJ-	3.3	----
ID008 6-6.5	JB53174-7	Cr ⁺⁶	0.98	NJ-	0.71	----
ID008 8-8.5	JB53174-8	Cr ⁺⁶	1.2	NJ-	0.51	----
Cr ⁺⁶ – Hexavalent chromium < – The analyte was analyzed for, but not detected at the specified reporting limit. NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; potential low bias.						

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

US EPA, CLP, 2010, ***“National Functional Guidelines for Inorganic Superfund Data Review”***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13***, September 2006.

US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53174 / JB 53174 R

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

Matrix interference for metals analyses.

(2x) JB 53174-4

(10x) JB 53174-9

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

Antimony in JB 53174-7

Thallium in JB 53174-7

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Two nickel results: JB 53174-4, 8.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No analytical procedural problems were noted.

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No

Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 6 and 7 for details.

*Qualified sample results are presented in
Tables 5 and 8 of the DV report.*



DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB53336
Sample Date: November 15, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewers: Faiza M. Botros
Janis V. Giga, Ph.D., REP5554
Report Date: February 20, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-six (26) soil samples and one (1) Field Blank collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 15, 2013 for sample delivery group (SDG) JB53336. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53336 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 26 collected soil samples and 1 Field Blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53336-1 through -26 (inclusive);
- Chromium (EJ) in Samples JB53336-1 through -26 (inclusive);
- Nickel (ENJ-) in Samples JB53336-1 through -11 (inclusive);
- Vanadium (ENJ-) in Samples JB53336-1 through -11 (inclusive);
- Vanadium (EJ) in Samples JB53336-12 through -26 (inclusive);

No other sample results in SDG JB53336 required qualification. Details are provided in the tables and text below. Most of the target metals concentrations were detected below the respective site remediation standard (SRS) limits, while eight (8) nickel, one vanadium and one hexavalent chromium (Cr+6) result exceeded the respective SRS values of 31 mg/Kg, 78 mg/Kg, and 20 mg/Kg.

The individual sample results that were qualified following the DV review are identified in Table 5 of this DV report. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The twenty-six (26) soil and one (1) Field Blank samples collected on November 15, 2013, were received November 15, 2013 at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 3.4°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. preserved and in good condition with on November 19,

2013 with sampling cooler temperatures of 3.4°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
FI001 0.5-1	JB53336-1	11/15/13	Soil	Metals, Cr ⁺⁶
FI001 2-2.5	JB53336-2	11/15/13	Soil	Metals, Cr ⁺⁶
FI001 4-4.5	JB53336-3	11/15/13	Soil	Metals, Cr ⁺⁶
FI001 6-6.5	JB53336-4	11/15/13	Soil	Metals, Cr ⁺⁶
FI001 8-8.5	JB53336-5	11/15/13	Soil	Metals, Cr ⁺⁶
FI002 0.5-1	JB53336-6	11/15/13	Soil	Metals, Cr ⁺⁶
FI002 2-2.5	JB53336-7	11/15/13	Soil	Metals, Cr ⁺⁶
FI002 4-4.5	JB53336-8	11/15/13	Soil	Metals, Cr ⁺⁶
FI002 6-6.5	JB53336-9	11/15/13	Soil	Metals, Cr ⁺⁶
FI002 8-8.5	JB53336-10	11/15/13	Soil	Metals, Cr ⁺⁶
FI004 0.5-1	JB53336-11	11/15/13	Soil	Metals, Cr ⁺⁶
FI004 2-2.5	JB53336-12	11/15/13	Soil	Metals, Cr ⁺⁶
FI004 4-4.5	JB53336-13	11/15/13	Soil	Metals, Cr ⁺⁶
FI004 6-6.5	JB53336-14	11/15/13	Soil	Metals, Cr ⁺⁶
FI004 8-8.5	JB53336-15	11/15/13	Soil	Metals, Cr ⁺⁶
FI003 0.5-1	JB53336-16	11/15/13	Soil	Metals, Cr ⁺⁶
FI003 2-2.5	JB53336-17	11/15/13	Soil	Metals, Cr ⁺⁶
FI003 4-4.5	JB53336-18	11/15/13	Soil	Metals, Cr ⁺⁶
FI003 6-6.5	JB53336-19	11/15/13	Soil	Metals, Cr ⁺⁶
FI003 8-8.5	JB53336-20	11/15/13	Soil	Metals, Cr ⁺⁶
DUP 18	JB53336-21	11/15/13	Soil	Metals, Cr ⁺⁶
DD010 0.5-1	JB53336-22	11/15/13	Soil	Metals, Cr ⁺⁶
DD010 2-2.5	JB53336-23	11/15/13	Soil	Metals, Cr ⁺⁶
DD010 4-4.5	JB53336-24	11/15/13	Soil	Metals, Cr ⁺⁶
DD010 6-6.5	JB53336-25	11/15/13	Soil	Metals, Cr ⁺⁶
DD010 8-8.5	JB53336-26	11/15/13	Soil	Metals, Cr ⁺⁶
FB12	JB53336-27	11/15/13	Aqueous	Metals, Cr ⁺⁶
<p>Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast, Inc. in Orlando, FL. Cr⁺⁶ – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.</p>				

Data Review

Data, as presented in the analytical data package SDG JB53336, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgment, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. There were some sample results of the 26 soil samples that exhibited concentrations above the respective site remediation standard (SRS) levels. These included 8 nickel results and one vanadium result.

Laboratory Case Narrative

The case narrative stated that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in QC batches MP26429 and MP26431, along with nickel, thallium and vanadium in MP26429. The case narrative identified the serial dilution results being outside QC limits for chromium and vanadium in QC batches MP26429 and MP26431, along with nickel in MP26429. The differences were probably due to sample non-homogeneity and/or matrix interference. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids analysis. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There were four analytical sequences that were used to analyze the soil and QC samples.

The 64% antimony recovery in the closing "CRI" standard of analytical sequence MA11244 recovered slightly below the 70-130% control limits. Thirteen soil samples were associated with this analytical sequence. However, it was observed that the detected concentrations and reporting limits for the non-detect results were all above the "affected range" (true spike \pm CRQL) for each of the associated samples and, consequently, no sample antimony results are subject to qualification (USEPA, 2010).

Additionally, there was one sample whose internal standard (IS#2) area count was above the identified QC limits in analytical sequence MA11240. Internal standard IS#2 is associated with chromium and vanadium. In the analytical sequence MA11240, the area count for IS #2 in JB53336-20 was identified as being outside QC limits on the QC summary report, exceeding the listed QC range of 60-125%. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Review of the data revealed that the area count for IS#2 in this sample was actually within the updated QC limits of 70-130%. Thus, this sample did not warrant reanalysis and the results for chromium and vanadium are considered acceptable. Consequently, the affected sample in MA11240 was not reanalyzed, as the IS area count is considered acceptable by the laboratory.

Thus, no soil sample results were qualified for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53336.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

(QC Limits 75-125% Recovery; ≤ 35%RPD)

The case narrative stated that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in QC batches MP26429 and MP26431, along with nickel, thallium, and vanadium in MP26429, of the two identified QC batches which are summarized in Table 2 below. These recoveries indicate possible matrix interference. However, the MS/MSD recoveries for thallium (76.9% and 77.3%) are actually within the QC limits of 75-125% when evaluation data quality (NJDEP, 2002) and are not subject to qualification.

Following the DV review, the sample results subject to qualification for low spike recoveries were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential or low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits. The MS recovery for chromium in MP26429 below QC limits, but the associated sample results are not subject to qualification because the initial sample concentration was more than four times the spike amount, such that the recovery may have been masked (overwhelmed) by the high chromium concentration in the sample (NJDEP, 2002).

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26429 Ω	FA10038-5	Antimony	18.3 %	18.4 %	NJ-	Low
MP26429 Ω	FA10038-5	Nickel	36.5 %	28.2 %	NJ-	Low
MP26429 Ω	FA10038-5	Vanadium	31.9 %	26.3 %	NJ-	Low
MP26431 †	FA10062-1	Antimony	34.1 %	30.9 %	NJ-	Low

QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate.
 Ω – The samples associated with QC Batch MP26429 consist of JB53336-1 through -11 (inclusive);
 † – The samples associated with QC Batch MP26431 consist of JB53336-12 through -26 (inclusive).

The post-digestion recoveries were outside QC limits for antimony, nickel and vanadium in the respective batches. The post-digestion spikes for antimony were slightly below QC limits in both batches, while the recoveries for nickel and vanadium were above QC limits. Sample results were not additionally qualified for the post-digestion spike recoveries (USEPA, 2010).

The antimony results in all of these affected samples (JB53336-1 through -26) are qualified as estimated values and flagged with "NJ-" due to a potential low bias, while the nickel and vanadium results in soil samples JB53336-1 through -11 (inclusive) are also qualified as estimated values and flagged "ENJ-" in conjunction with the serial dilution results that were above the 10%D QC limit. These qualified results are presented below in summary table, Table 5, together with the sample results qualified for serial dilution analysis results that were also outside QC limits.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on two QC samples analyzed in duplicate. All %RPD values were below the QC limit of 35%RPD, with values ranging 0-9.4%RPD for soil samples and no results required qualification. The duplicate analyses demonstrated very good analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 92.3% - 102.4% for the soil sample metals analysis.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results being outside QC limits for chromium and vanadium in QC batches MP26429 and MP26431, along with nickel in MP26429. The differences were probably due to sample non-homogeneity and/or matrix interference. Thus, the affected chromium, nickel, and vanadium results in the samples associated with the elevated %D exceedances are subject to qualification following the DV review, as indicated in Table 3 below.

Table 3. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26429 Ω	FA10038-5	Chromium	39.3 %D	EJ
MP26429 Ω	FA10038-5	Nickel	41.8 %D	EJ
MP26429 Ω	FA10038-5	Vanadium	37.9 %D	EJ
MP26431 †	FA10062-1	Chromium	14.7 %D	EJ
MP26431 †	FA10062-1	Vanadium	13.6 %D	EJ

Key:
 EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
 Ω – The samples associated with QC Batch MP26429 consist of JB53336-1 through -11 (inclusive);
 † – The samples associated with QC Batch MP26431 consist of JB53336-12 through -26 (inclusive).

The associated chromium, nickel and vanadium results in samples with laboratory sample ID numbers ranging JB53336-1 through -11, inclusive, and chromium and vanadium results with laboratory sample ID numbers JB53336-12 through -26 (inclusive) are qualified as estimated values and flagged with "EJ" to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 5,

along with those results qualified for matrix spike recoveries outside QC limits and flagged with "ENJ-".

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

One set of field duplicate samples was collected as part of SDG JB53336. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2010), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the one pair of field duplicate samples are presented in Table 4, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar in this pair of field duplicate samples analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 29 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all five analyte pairs for the field duplicates from FI003 8-8.5.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB53336

Analyte	FI003 8-8.5 (mg/Kg)	DUP 18 (mg/Kg)	% RPD	DV Flag
Antimony	< 1.1 NJ-	< 2.4 NJ-	< 2 × CRQL	-
Chromium	13.3 EJ	14.7 EJ	10.0 %	-
Nickel	20.9	19.6	6.4 %	-
Thallium	< 0.54	< 1.2	< 2 × CRQL	-
Vanadium	12.2 EJ	16.3 EJ	28.8 %	-
<p>< – The analyte was not detected at the stated reporting limit; J – The reported result is an estimated value; NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low; EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction. CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit; < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.</p>				

Thus, the results for the field duplicate samples from FI003 8-8.5 demonstrated very good sampling representativeness and precision, such that the associated results need not be qualified.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The vanadium concentration for Sample FI002 0.5-1 (JB53336-6) was listed as 78.1 mg/Kg on the reporting form and 1.653 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(1,653 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.24 \text{ g}) (85.3/100\%)} = \frac{82,650}{1,057.72} = 78.1398 \mu\text{g/g}$$

$$= 78.1 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 78.1 mg/Kg for Sample FI002 0.5-1 was correctly reported.

Reporting Limits

There were 24 of the 26 soil samples that underwent dilution by either a dilution factor of 2x, 4x, or 5x. However, all reporting limits were still below the respective SRS criterion.

Summary

The soil sample analytical results for the samples of SDG JB53336 were found to be compliant with the analytical methods for the analysis of metals in the twenty-six soil samples and one field blank using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries, and differences in the serial dilution analysis, as summarized in Tables 2 and 3. The individual associated sample results are qualified accordingly and listed in Table 5 below. Sample analyte results are flagged with either "NJ-", "EJ", or "ENJ-".

Table 5. Summary Qualified Sample Metals Results in SDG JB53336

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
FI001 0.5-1	JB53336-1	Antimony	< 1.8	NJ-
FI001 0.5-1	JB53336-1	Chromium	21.7	EJ
FI001 0.5-1	JB53336-1	Nickel	11.6	ENJ-
FI001 0.5-1	JB53336-1	Vanadium	20.9	ENJ-
FI001 2-2.5	JB53336-2	Antimony	< 4.9	NJ-
FI001 2-2.5	JB53336-2	Chromium	14.5	EJ
FI001 2-2.5	JB53336-2	Nickel	16.4	ENJ-
FI001 2-2.5	JB53336-2	Vanadium	17.4	ENJ-
FI001 4-4.5	JB53336-3	Antimony	< 4.1	NJ-
FI001 4-4.5	JB53336-3	Chromium	13.2	EJ
FI001 4-4.5	JB53336-3	Nickel	16.9	ENJ-
FI001 4-4.5	JB53336-3	Vanadium	24.8	ENJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
FI001 6-6.5	JB53336-4	Antimony	< 5.0	NJ-
FI001 6-6.5	JB53336-4	Chromium	20.2	EJ
FI001 6-6.5	JB53336-4	Nickel	15.8	ENJ-
FI001 6-6.5	JB53336-4	Vanadium	22.9	ENJ-
FI001 8-8.5	JB53336-5	Antimony	< 4.5	NJ-
FI001 8-8.5	JB53336-5	Chromium	19.7	EJ
FI001 8-8.5	JB53336-5	Nickel	22.0	ENJ-
FI001 8-8.5	JB53336-5	Vanadium	18.3	ENJ-
FI002 0.5-1	JB53336-6	Antimony	2.8	NJ-
FI002 0.5-1	JB53336-6	Chromium	654	EJ
FI002 0.5-1	JB53336-6	Nickel	39.0	ENJ-
FI002 0.5-1	JB53336-6	Vanadium	78.1	ENJ-
FI002 2-2.5	JB53336-7	Antimony	< 1.7	NJ-
FI002 2-2.5	JB53336-7	Chromium	67.5	EJ
FI002 2-2.5	JB53336-7	Nickel	17.8	ENJ-
FI002 2-2.5	JB53336-7	Vanadium	27.3	ENJ-
FI002 4-4.5	JB53336-8	Antimony	< 4.1	NJ-
FI002 4-4.5	JB53336-8	Chromium	13.0	EJ
FI002 4-4.5	JB53336-8	Nickel	14.2	ENJ-
FI002 4-4.5	JB53336-8	Vanadium	16.9	ENJ-
FI002 6-6.5	JB53336-9	Antimony	< 4.1	NJ-
FI002 6-6.5	JB53336-9	Chromium	14.3	EJ
FI002 6-6.5	JB53336-9	Nickel	17.5	ENJ-
FI002 6-6.5	JB53336-9	Vanadium	19.9	ENJ-
FI002 8-8.5	JB53336-10	Antimony	< 3.8	NJ-
FI002 8-8.5	JB53336-10	Chromium	10.7	EJ
FI002 8-8.5	JB53336-10	Nickel	10.2	ENJ-
FI002 8-8.5	JB53336-10	Vanadium	15.6	ENJ-
FI004 0.5-1	JB53336-11	Antimony	< 2.1	NJ-
FI004 0.5-1	JB53336-11	Chromium	21.2	EJ
FI004 0.5-1	JB53336-11	Nickel	12.0	ENJ-
FI004 0.5-1	JB53336-11	Vanadium	13.1	ENJ-
FI004 2-2.5	JB53336-12	Antimony	< 3.6	NJ-
FI004 2-2.5	JB53336-12	Chromium	28.8	EJ
FI004 2-2.5	JB53336-12	Vanadium	22.1	EJ
FI004 4-4.5	JB53336-13	Antimony	< 2.0	NJ-
FI004 4-4.5	JB53336-13	Chromium	15.8	EJ
FI004 4-4.5	JB53336-13	Vanadium	22.3	EJ
FI004 6-6.5	JB53336-14	Antimony	2.5	NJ-
FI004 6-6.5	JB53336-14	Chromium	136	EJ
FI004 6-6.5	JB53336-14	Vanadium	50.8	EJ
FI004 8-8.5	JB53336-15	Antimony	2.2	NJ-
FI004 8-8.5	JB53336-15	Chromium	121	EJ
FI004 8-8.5	JB53336-15	Vanadium	33.7	EJ
FI003 0.5-1	JB53336-16	Antimony	< 3.5	NJ-
FI003 0.5-1	JB53336-16	Chromium	29.0	EJ
FI003 0.5-1	JB53336-16	Vanadium	22.2	EJ
FI003 2-2.5	JB53336-17	Antimony	< 1.9	NJ-
FI003 2-2.5	JB53336-17	Chromium	17.7	EJ
FI003 2-2.5	JB53336-17	Vanadium	20.2	EJ
FI003 4-4.5	JB53336-18	Antimony	< 3.8	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
FI003 4-4.5	JB53336-18	Chromium	22.0	EJ
FI003 4-4.5	JB53336-18	Vanadium	24.2	EJ
FI003 6-6.5	JB53336-19	Antimony	3.6	NJ-
FI003 6-6.5	JB53336-19	Chromium	240	EJ
FI003 6-6.5	JB53336-19	Vanadium	56.4	EJ
FI003 8-8.5	JB53336-20	Antimony	< 1.1	NJ-
FI003 8-8.5	JB53336-20	Chromium	13.3	EJ
FI003 8-8.5	JB53336-20	Vanadium	12.2	EJ
DUP 18	JB53336-21	Antimony	< 2.4	NJ-
DUP 18	JB53336-21	Chromium	14.7	EJ
DUP 18	JB53336-21	Vanadium	16.3	EJ
DD010 0.5-1	JB53336-22	Antimony	< 2.1	NJ-
DD010 0.5-1	JB53336-22	Chromium	88.6	EJ
DD010 0.5-1	JB53336-22	Vanadium	31.0	EJ
DD010 2-2.5	JB53336-23	Antimony	< 2.0	NJ-
DD010 2-2.5	JB53336-23	Chromium	26.2	EJ
DD010 2-2.5	JB53336-23	Vanadium	21.2	EJ
DD010 4-4.5	JB53336-24	Antimony	< 2.0	NJ-
DD010 4-4.5	JB53336-24	Chromium	30.0	EJ
DD010 4-4.5	JB53336-24	Vanadium	19.9	EJ
DD010 6-6.5	JB53336-25	Antimony	< 4.3	NJ-
DD010 6-6.5	JB53336-25	Chromium	29.6	EJ
DD010 6-6.5	JB53336-25	Vanadium	16.9	EJ
DD010 8-8.5	JB53336-26	Antimony	< 2.9	NJ-
DD010 8-8.5	JB53336-26	Chromium	298	EJ
DD010 8-8.5	JB53336-26	Vanadium	46.5	EJ

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- J – The reported result is an estimated value.
- NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
- E – The serial dilution result is outside control limits; indeterminate bias direction;
- EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one batch for the field blank (aqueous).

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- √ Holding times
- √ Blank Analysis
- √ Calibration standards
- √ Matrix spike recoveries
- √ Duplicate analysis
- √ Laboratory control samples

- √ Calibration verification
- √ Quantitation checks
- √ Data package

- √ Field duplicate sample analysis
- √ Data qualifiers

Hexavalent chromium was detected in 17 of 26 soil samples analyzed in SDG JB53336. Cr⁺⁶ results had exceeded the SRS of 20 mg/Kg in one (1) soil sample.

Case Narrative

The case narrative indicated that the QC requirements were met for issues such as holding time, method blanks, soluble and insoluble blank spike, and matrix spike recoveries. However, the RPD value for the duplicate sample was high due to possible sample non-homogeneity in batch GP76229. Good MS, post spike recovery (101%) on this sample. All other QC requirements were met for the associated samples.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with values of 0.99990, 0.9997 and 0.9996; values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 90.7% to 100.4% for the three QC batches associated with the 26 soil samples and one (1) Field Blank, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 6. No hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 6. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76206 ¥	JB53336-13	Cr ⁺⁶ , soluble	97.1 %	----	----
GP76206 ¥	JB53336-13	Cr ⁺⁶ , insoluble	91.0 %	----	----
GP76206 ¥	JB53336-13	Cr ⁺⁶ , post-digestion spike	100 %	----	----
GP76229 §	JB53336-18	Cr ⁺⁶ , soluble	91.3 %	----	----
GP76229 §	JB53336-18	Cr ⁺⁶ , insoluble	91.5 %	----	----
GP76229 §	JB53336-18	Cr ⁺⁶ , post-digestion spike	101 %	----	----
<p>QC Limits are 75-125% (soil) for MS recovery; 85-115% for post spike recovery. MS – Matrix spike Cr⁺⁶ – Hexavalent chromium ¥ – The samples associated with QC Batch GP76206 consist of JB53336-1 through -13 (inclusive); § – The samples associated with QC Batch GP76229 consist of JB53336-14 through -26 (inclusive).</p>					

Duplicate Sample Analysis

The duplicate analysis was performed on two sets of duplicate samples. The %RPD value for the QC batch GP76229 was high (94.5%) due to possible sample non-homogeneity. However, upon inspection of the raw data, it was found that the difference between the two concentrations was less than 2x the reporting limit for Cr+6 in this sample ($1.2 - 0.43 = 0.79$, $< 2 \times 0.45 = 0.90$ mg/Kg). The RPD value for QC batch GP76206 was within the QC limits of 35%RPD for soil samples (USEPA, 2010; AECOM, 2010). Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 90.6% to 94.3%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in any of the three analytical sequences. Although serial dilution analysis is not required by the analytical method, the analyst will, on occasion, perform a serial dilution analysis to provide additional QC information.

Field Duplicate Sample Analysis (QC Limit \leq 50%RPD)

The results for the analysis of the one pair of field duplicate samples are presented in Table 7, below.

Table 7. Comparison of Field Duplicate Soil Sample Results – SDG JB53336

Analyte	FI003 8-8.5 (mg/Kg)	DUP 18 (mg/Kg)	% RPD	DV Flag
Hexavalent Chromium	< 0.54	< 0.53	< 2 × CRQL	-

QC Limit is \leq 50 %RPD or $< 2 \times$ CRQL;
CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
< 2 × CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

The results for the hexavalent chromium concentrations in the field duplicate samples from FI003 8-8.5 were almost identical non-detect results and, thus, considered representative, as the concentrations between field duplicate samples differed by less than two times the reporting limit value ($< 2 \times$ CRQL). Excellent sampling representativeness and precision was demonstrated by the pair of field duplicate soil samples from FI003 8-8.5.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample DD010 6-6.5 (JB53336-25) was listed as 24.9 mg/Kg on the reporting form and 0.4863 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.4863 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00250 \text{ Kg} \times 78.0/100} = \frac{0.04863}{0.00195} = 24.94 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 24.9 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 24.9 mg/Kg for Sample DD010 6-6.5 was correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 26 soil samples of this SDG, JB53336. Thus, this detected Cr⁺⁶ concentration result was above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

Most samples were observed to fall below the Eh-pH phase diagram line. These results suggest that many of the samples experience conditions of reducing soil environment. Some of the samples (2 out of 26) fall on or slightly above the Eh-pH phase diagram line. These results suggest that some of the samples may experience condition of an oxidizing soil environment. However, the reported Cr⁺⁶ results of the affected samples are considered acceptable because of two issues, the Cr⁺⁶ concentration of the samples in the oxidizing environment are below the SRS (20 mg/Kg). The Cr+6 results of the other samples in the reducing soil are not expected to increase in value because oxidation to Cr⁺⁶ is not favorable under reducing soil conditions. Thus, the hexavalent chromium results are considered acceptable as reported with the highest hexavalent chromium concentration (24.9 mg/Kg) was above the SRS of 20 mg/Kg, as detailed in the text above.

Summary for Hexavalent Chromium Analysis

The %RPD value in the duplicate sample for the QC batch GP76229 was high (94.5%) due to possible sample non-homogeneity. However, upon checking it was found that the difference between the two concentrations was less than 2x the reporting limit for Cr+6 in this sample. All other QC results associated with the hexavalent chromium analysis were within QC limits.

Consequently, sample results were not affected and no qualification was needed for Cr+6 results in SDG JB53336.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

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ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53336

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? for metals analysis. Yes No
Indicate the identity of the samples and why. Matrix interference

(2x) JB53336 - 1, 6, 7, 11, 13, 15, 17, 19, 21, 22, 23, 24, 26.
 (4x) JB53336 - 5, 12, 16, 18, 25.
 (5x) JB53336 - 2, 3, 4, 8, 9, 10.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Eight nickel results: JB53336 - 6, 14, 19, 22, 23, 24, 25, 26.
 One vanadium result: JB53336 - 6.
 one Cr⁺⁶ result: JB53336 - 25.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.
 No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*

10. Were rejected data used?..... Yes No

- If "yes", please indicate reasons rejected data were used:
- For Hex Chrome, data were rejected because spike recovery was <50%.
 - Data were rejected due to missing deliverables.
 - Data were rejected but an applicable standard exceedance exists.
 - Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 - Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

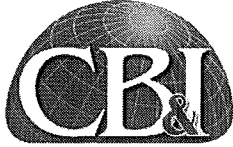
16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

*Refer to DV report Tables 2 and 3 for details.
Qualified sample results are presented in
Table 5 of the DV report.*



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs B53451/JB53451R/JB53451RT
Sample Date: November 18, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis Giga, Ph.D., REP5554
Report Date: February 17, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-one (21) soil samples and one (1) field blank (FB) collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 18, 2013 for sample delivery group (SDG) JB53451. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53451 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 21 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53451-1 through -21 (inclusive);
- Chromium (NJ+) in Samples JB53451-1 through -9 (inclusive);
- Chromium (EJ) in Samples JB53451-10 through -21 (inclusive);
- Nickel (EJ) in Samples JB53451-10 through -21 (inclusive);
- Vanadium (NJ+) in Samples JB53451-1 through -9 (inclusive);
- Vanadium (ENJ-) in Samples JB53451-10 through -21 (inclusive);
- Nickel and Cr^{+6} (J) in field duplicate samples JB53451-12 and JB53451-16;
- Hexavalent chromium (NJ-) in Samples JB53451-12 through -21 (inclusive);
- Hexavalent chromium (NJ-) in reanalyzed samples JB53451-12R through -21R (inclusive).

No other sample results in SDG JB53451 required qualification. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for 9 hexavalent chromium (Cr⁺⁶) results, one antimony result; and one nickel and vanadium result in JB53451-1. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were qualified following the DV review are presented in Tables 5 and 9 of this DV report.

Sample Receipt

The twenty-one (21) soil samples and one (1) field blank collected November 18, 2013 were received the same day at the Accutest laboratory with acceptable sampling cooler temperatures of 2.6°C. The samples destined for metals analysis were received at the Accutest Laboratory SE in Orlando, Florida November 20, 2013 preserved and intact with sampling cooler temperatures of 2.6°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
KD006 5.5-6	JB53451-1	11/18/13	Soil	Metals, Cr+6
KD006 6.5-7	JB53451-2	11/18/13	Soil	Metals, Cr+6
KD006 7.5-8	JB53451-3	11/18/13	Soil	Metals, Cr+6
KD006 8.5-9	JB53451-4	11/18/13	Soil	Metals, Cr+6
KD006 9.5-10	JB53451-5	11/18/13	Soil	Metals, Cr+6
LD005 5.5-6	JB53451-6	11/18/13	Soil	Metals, Cr+6
LD005 6.5-7	JB53451-7	11/18/13	Soil	Metals, Cr+6
LD005 7.5-8	JB53451-8	11/18/13	Soil	Metals, Cr+6
LD005 8.5-9	JB53451-9	11/18/13	Soil	Metals, Cr+6
LD005 9.5-10	JB53451-10	11/18/13	Soil	Metals, Cr+6
LD004 5-5.5	JB53451-11	11/18/13	Soil	Metals, Cr+6
LD004 6-6.5	JB53451-12	11/18/13	Soil	Metals, Cr+6
LD004 7-7.5	JB53451-13	11/18/13	Soil	Metals, Cr+6
LD004 8-8.5	JB53451-14	11/18/13	Soil	Metals, Cr+6
LD004 9-9.5	JB53451-15	11/18/13	Soil	Metals, Cr+6
DUP 19	JB53451-16	11/18/13	Soil	Metals, Cr+6
LD003 4.5-5	JB53451-17	11/18/13	Soil	Metals, Cr+6
LD003 5.5-6	JB53451-18	11/18/13	Soil	Metals, Cr+6
LD003 6.5-7	JB53451-19	11/18/13	Soil	Metals, Cr+6
LD003 7.5-8	JB53451-20	11/18/13	Soil	Metals, Cr+6
LD003 8.5-9	JB53451-21	11/18/13	Soil	Metals, Cr+6
FB 13	JB53451-22	11/18/13	Aqueous	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando, FL.
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB53451, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Two of the 21 soil samples exhibited metals concentrations above the respective site remediation standard (SRS) where antimony exceeded the SRS of 6 mg/Kg in JB53451-13, and nickel and vanadium in JB53451-1 were above the respective SRS values of 6 and 31 mg/Kg.

Laboratory Case Narrative

The extensive case narrative identified all analytes for the samples that were diluted, listing them individually by analyte. Matrix spike (MS) recoveries for antimony, chromium and vanadium were identified as being outside QC limits in QC Batch MP26432 along with the matrix spike duplicate (MSD) recoveries of antimony and chromium due to matrix interferences and/or sample non-homogeneity. Antimony was outside QC limits for the MS/MSD recoveries in MP26439, along with the MSD recovery of vanadium. The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26439 for chromium, nickel, and vanadium and stated that the probable cause is due to sample non-homogeneity and/or matrix interference. Non-client samples served as the QC sample in each batch. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. Details are discussed in the sections below. The metals analyses were performed at the Accutest Laboratories Southeast in Orlando, Florida.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard area counts identified below for analytical sequence MA11238, and the low closing CRDL standard recovery for antimony in analytical sequence MA11244.

The exceptions included the internal standard area counts for IS#2 which is associated with chromium and vanadium in analytical run MA11238. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, the three affected samples in MA11238, JB53451-2 (126%), JB53451-5 (127%), and JB53451-7 (125%) were all less than 127% and apparently, therefore, not reanalyzed, as the IS area counts are considered acceptable by the laboratory representatives.

The closing CRDL standard (CRIA2) recovered on 64% for antimony, a value below the QC limits of 70-130%. The 64% antimony recovery in the closing "CRI" standard of analytical sequence MA11244 recovered slightly below the 70-130% control limits. Eight soil samples were associated with this analytical sequence. However, it was observed that the detected concentrations and reporting limits for the non-detect results (approximately 1 mg/Kg) were all above the "affected range" (true spike \pm CRQL) of approximately 0-0.6 mg/Kg for each of the associated samples and, consequently, no sample antimony results are subject to qualification (USEPA, 2010). Additionally, the analysis of a CRDL standard is not addressed in either Method 6010C or the associated DV guidelines (NJDEP, 2002).

No soil sample results warranted qualification for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53451.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony in QC batches for soil samples were below QC limits, as summarized in Table 2 below. The MS/MSD recoveries for chromium and the MS recovery for vanadium were above QC limits of 75 - 125% for the non-client QC sample in QC Batch MP26432, while the MSD recovery for vanadium in QC Batch MP26439 was below the QC limits, as summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. None of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits. Following the DV review, the sample results subject to qualification for spike recoveries outside QC limits were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with either "J+" or "J-" to indicate the possible presence of a possible high or low bias in the ability to recovery the particular analyte in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26432 Ω	FA10098-1	Antimony	20.3 %	18.0 %	NJ-	Low
MP26432 Ω	FA10098-1	Chromium	137.6 %	131.7 %	NJ+	High
MP26432 Ω	FA10098-1	Vanadium	131.4 %	80.4 %	NJ+	High
MP26439 †	FA10289-1	Antimony	27.1%	29.9 %	NJ-	Low
MP26439 †	FA10289-1	Vanadium	80.8 %	67.8 %	NJ-	Low
QC Limits are 75-125%; Post-digestion spike QC is 80-120% NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. NJ+ – The matrix spike recovery was below QC limits; associated sample results may experience a potential high bias. MS – Matrix spike MSD – Matrix spike duplicate Ω – The samples associated with QC Batch MP26432 consist of JB53451-1 through -9 (inclusive); † – The samples associated with QC Batch MP26439 consist of JB53451-10 through -21 (inclusive).						

The spike recoveries for chromium were observed to be biased high, however, the chromium concentration in the initial QC sample (FA10098-1) was almost four times the spike amount and some masking of the spike might have been responsible for the elevated MS/MSD recoveries. The chromium results in the associated samples were qualified as estimated values and flagged with "NJ+" due to a potential positive bias in the ability to recover chromium in the associated samples, which included those with laboratory sample ID numbers JB53451-1 through -9. The vanadium results for these samples are also flagged with "NJ+", while the antimony results in these samples and those of JB53451-1 through -21 are flagged with "NJ-" due to a potential low bias. The vanadium results are also flagged with "NJ-" in the second set of samples. These qualified results are presented below in summary table, Table 5 together with the results qualified for serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate soil sample analysis was performed on two QC samples and on two pairs of spiked duplicate samples. All %RPD values were below the QC limit of 35%RPD for soil samples and no

results required qualification. The RPD values for the soils samples analysis ranged 0 to 7.0 %RPD for the duplicate analyses and 3.3 to 19.6%RPD for the spiked duplicate analysis. The duplicate and spike duplicate results in the QC batch associated with the field blank were also within the 20%RPD QC limits for aqueous samples. Therefore, the duplicate analyses demonstrated very good analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 96.8% - 106.2%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26439 for chromium, nickel, and vanadium and stated that the probable cause is due to sample non-homogeneity and/or matrix interference. These are detailed in Table 3 below.

Table 3. Serial Dilution Results Outside QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26439 †	FA10289-1	Chromium	24.7 %	EJ
MP26439 †	FA10289-1	Nickel	23.8 %	EJ
MP26439 †	FA10289-1	Vanadium	23.0 %	EJ
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.				
† – The samples associated with QC Batch MP26439 consist of JB53451-10 through -21 (inclusive).				

The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB53451-10 through -21, inclusive, are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 5, along with those results qualified for low matrix spike recoveries.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

One set of field duplicate samples was collected as part of SDG JB53451. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying results from the USEPA CLP program for soil samples analyzed by ICP-AES using the CLP Statement of Work (SOW) ISM01.X (but not Method 6010C) that differ by more than 50%RPD or > 2 × CRQL (USEPA, 2010; AECOM, 2010).

The results for the analysis of the one pair of field duplicate samples are presented in Table 4, below. It is evident that the results for the metals analytes that were detected in the field duplicate samples were very similar and, thus, considered representative, as the concentrations between field duplicate samples differed by less than 30 %RPD or differed by less than two times the reporting limit value (< 2 × CRQL) for all analyte pairs, except for the 66%RPD for nickel, thereby meeting the QC limits for field duplicate samples for all but one parameter.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB53451

Analyte	LD004 6-6.5 (mg/Kg)	DUP 19 (mg/Kg)	% RPD	DV Flag
Antimony	< 0.85 NJ-	< 4.2 NJ-	< 2 × CRQL	-
Chromium	208 EJ	256 EJ	20.7 %	-
Nickel	28.8 EJ	14.5 EJ	66.0 %	(J)
Thallium	< 0.43	< 2.1	< 2 × CRQL	-
Vanadium	43.6 ENJ-	32.4 ENJ-	29.5 %	-

< – The analyte was not detected at the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
 EJ – The reported value is estimated because of the presence of interference with indeterminate bias direction.
 (J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy.
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit.
 < 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

This pair of field duplicate samples demonstrated acceptable sampling representativeness and precision for the five target metals analyzed. The only results subject to qualification were the nickel results LD004 6-6.5 and DUP 19. However, since these nickel results are qualified for the disparity in the serial dilution analysis and may exhibit a potential variability due to possible matrix interferences, the results were not flagged with an additional “J” flag in order to avoid redundancy in qualifiers.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported antimony results:

$$\text{Antimony (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The antimony concentration for Sample LD004 5-5.5 (JB53451-13) was listed as 7.3 mg/Kg on the reporting form and 0.146 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Antimony (mg/Kg)} = \frac{(146 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.20 \text{ g}) (82.9\%/100\%)}$$

$$= 7.3 \text{ mg/Kg dry weight}$$

After rounding to two significant figures, this verifies that the antimony concentration of 7.3 mg/Kg for Sample LD004 5-5.5 was correctly reported. This value is above the SRS of 6 mg/Kg. Antimony was detected in two other samples at concentrations of 1.9 mg/Kg or less.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of twelve of the 21 soil samples had been diluted by a factor of either two, four or five. The reporting limits for the target analytes determined for the inductively coupled argon plasma spectrometer (ICP) analysis employing the various assigned laboratory instruments all were below the respective site remediation standards.

Summary

The soil sample analytical results for the samples of SDG JB53451 were found to be compliant with the analytical methods for the analysis of metals in the twenty-one soil samples using SW-846 Method 6010C. The QC criteria were met for all ICP target analyte analyses, except for the low MS/MSD recoveries for antimony in both soil sample QC batches which employed a non-client soil sample for the QC analyses. Sample results were qualified based on the results of the non-client QC samples because the sample concentrations were not unlike those observed in PPG soil samples. Chromium and vanadium experienced elevated matrix spike recoveries in the the QC batch associated with samples JB53451-1 through -9, while vanadium experienced a low MSD recovery in the second QC batch. The soil samples collected November 18, 2013 are qualified as estimated values for antimony, chromium, and vanadium (flagged "NJ-" or "NJ+") in the associated soil samples due to a potential low or high bias, as indicated below in Table 5. The serial dilution results were outside QC limits suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the chromium, nickel and vanadium results are qualified as estimated values and are flagged with "EJ" in Table 5 below for samples numbered JB53451-10 through -21 (inclusive).

Table 5. Summary of Qualified Sample Metals Results in SDG JB53451

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
KD006 5.5-6	JB53451-1	Antimony	< 5.1	NJ-
KD006 5.5-6	JB53451-1	Chromium	1270	NJ+
KD006 5.5-6	JB53451-1	Vanadium	153	NJ+
KD006 6.5-7	JB53451-2	Antimony	1.9	NJ-
KD006 6.5-7	JB53451-2	Chromium	268	NJ+
KD006 6.5-7	JB53451-2	Vanadium	29.6	NJ+
KD006 7.5-8	JB53451-3	Antimony	< 3.5	NJ-
KD006 7.5-8	JB53451-3	Chromium	269	NJ+
KD006 7.5-8	JB53451-3	Vanadium	38.7	NJ+
KD006 8.5-9	JB53451-4	Antimony	< 2.1	NJ-
KD006 8.5-9	JB53451-4	Chromium	58.0	NJ+
KD006 8.5-9	JB53451-4	Vanadium	33.1	NJ+

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
KD006 9.5-10	JB53451-5	Antimony	< 0.94	NJ-
KD006 9.5-10	JB53451-5	Chromium	68.4	NJ+
KD006 9.5-10	JB53451-5	Vanadium	20.4	NJ+
LD005 5.5-6	JB53451-6	Antimony	< 3.8	NJ-
LD005 5.5-6	JB53451-6	Chromium	26.4	NJ+
LD005 5.5-6	JB53451-6	Vanadium	31.7	NJ+
LD005 6.5-7	JB53451-7	Antimony	1.3	NJ-
LD005 6.5-7	JB53451-7	Chromium	52.7	NJ+
LD005 6.5-7	JB53451-7	Vanadium	29.1	NJ+
LD005 7.5-8	JB53451-8	Antimony	< 1.1	NJ-
LD005 7.5-8	JB53451-8	Chromium	12.9	NJ+
LD005 7.5-8	JB53451-8	Vanadium	16.2	NJ+
LD005 8.5-9	JB53451-9	Antimony	< 1.0	NJ-
LD005 8.5-9	JB53451-9	Chromium	9.1	NJ+
LD005 8.5-9	JB53451-9	Vanadium	13.8	NJ+
LD005 9.5-10	JB53451-10	Antimony	< 1.8	NJ-
LD005 9.5-10	JB53451-10	Chromium	10.1	EJ
LD005 9.5-10	JB53451-10	Nickel	8.7	EJ
LD005 9.5-10	JB53451-10	Vanadium	15.5	ENJ-
LD004 5-5.5	JB53451-11	Antimony	< 4.1	NJ-
LD004 5-5.5	JB53451-11	Chromium	303	EJ
LD004 5-5.5	JB53451-11	Nickel	15.3	EJ
LD004 5-5.5	JB53451-11	Vanadium	32.3	ENJ-
LD004 6-6.5	JB53451-12	Antimony	< 0.85	NJ-
LD004 6-6.5	JB53451-12	Chromium	208	EJ
LD004 6-6.5	JB53451-12	Nickel	28.8	EJ
LD004 6-6.5	JB53451-12	Vanadium	43.6	ENJ-
LD004 7-7.5	JB53451-13	Antimony	7.3	NJ-
LD004 7-7.5	JB53451-13	Chromium	1110	EJ
LD004 7-7.5	JB53451-13	Nickel	20.7	EJ
LD004 7-7.5	JB53451-13	Vanadium	40.7	ENJ-
LD004 8-8.5	JB53451-14	Antimony	< 1.9	NJ-
LD004 8-8.5	JB53451-14	Chromium	10.6	EJ
LD004 8-8.5	JB53451-14	Nickel	10.8	EJ
LD004 8-8.5	JB53451-14	Vanadium	15.4	ENJ-
LD004 9-9.5	JB53451-15	Antimony	< 2.0	NJ-
LD004 9-9.5	JB53451-15	Chromium	13.3	EJ
LD004 9-9.5	JB53451-15	Nickel	9.0	EJ
LD004 9-9.5	JB53451-15	Vanadium	20.9	ENJ-
DUP 19	JB53451-16	Antimony	< 4.2	NJ-
DUP 19	JB53451-16	Chromium	256	EJ
DUP 19	JB53451-16	Nickel	14.5	EJ
DUP 19	JB53451-16	Vanadium	32.4	ENJ-
LD003 4.5-5	JB53451-17	Antimony	< 4.6	NJ-
LD003 4.5-5	JB53451-17	Chromium	216	EJ
LD003 4.5-5	JB53451-17	Nickel	15.7	EJ
LD003 4.5-5	JB53451-17	Vanadium	28.9	ENJ-
LD003 5.5-6	JB53451-18	Antimony	< 0.93	NJ-
LD003 5.5-6	JB53451-18	Chromium	147	EJ
LD003 5.5-6	JB53451-18	Nickel	7.5	EJ
LD003 5.5-6	JB53451-18	Vanadium	16.3	ENJ-
LD003 6.5-7	JB53451-19	Antimony	< 1.9	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
LD003 6.5-7	JB53451-19	Chromium	16.3	EJ
LD003 6.5-7	JB53451-19	Nickel	12.9	EJ
LD003 6.5-7	JB53451-19	Vanadium	21.2	ENJ-
LD003 7.5-8	JB53451-20	Antimony	< 1.1	NJ-
LD003 7.5-8	JB53451-20	Chromium	10.2	EJ
LD003 7.5-8	JB53451-20	Nickel	8.4	EJ
LD003 7.5-8	JB53451-20	Vanadium	16.1	ENJ-
LD003 8.5-9	JB53451-21	Antimony	< 1.1	NJ-
LD003 8.5-9	JB53451-21	Chromium	11.9	EJ
LD003 8.5-9	JB53451-21	Nickel	8.4	EJ
LD003 8.5-9	JB53451-21	Vanadium	18.9	ENJ-

Key:

- < – The analyte was analyzed for, but was not detected above the stated reporting limit.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J – Indicates an estimated value.
- J+ – The result is an estimated value, but the result may be biased high.
- J- – The result is an estimated value, but the result may be biased low.
- E – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr+6) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one QC batch for the single field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|---------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Field Duplicate Sample analysis |
| √ Data package completeness | √ Serial dilution analysis |
| √ Data qualifiers | √ Quantitation checks |

Hexavalent chromium was detected in nineteen of the 21 soil samples, with nine concentrations exceeding the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that the QC requirements were met, including the holding time, method blanks, and matrix spike recoveries, except for the low MS recoveries in QC Batch GP76299. The RPD(s) for the Duplicate in QC Batch GP76299 was outside QC limits, but the RPD was acceptable due to low duplicate and sample concentrations. The soluble MS recovery in QC Batch GP76275 was outside QC limits but the soluble spike amount was low relative to the sample amount.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values all exceeding 0.99982 values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 98.1% to 101.5% for the two QC batches associated with the 21 soil samples, and 100.2% for the QC batch associated with the field blank sample, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or the field blanks. Thus, no sample results are affected or qualified for any potential QC blank contamination. Hexavalent chromium was not detected in the field blanks at a reporting limit of 0.010 mg/L.

Matrix Spike Analysis

The matrix spike recoveries were within the QC limits of 75-125%, except for the soluble MS recovery for JB53451-14 in QC Batch GP76299. The soluble MS recovery in QC Batch GP76275 was 134.5%, a value above the QC limits. However, since the initial Cr+6 concentration in JB53451-1 was more than four times the spike value, the associated sample results were not subject to qualification, because the low spike amount may have been masked by the sample amount, thereby potentially affecting the spike recovery (NJDEP, 2005).

The 1.9% soluble matrix spike recovery for hexavalent chromium was below the QC limits of 75-125% for batch QC Sample JB53451-14 in QC Batch GP76299, which indicates possible matrix interference. All other matrix spike recoveries were within the respective QC limits, as summarized below in Table 6.

Table 6. Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76275 £	JB53451-1	Cr+6, soluble	134.5 %	----	----
GP76275 £	JB53451-1	Cr+6, insoluble	82.7 %	----	----
GP76275 £	JB53451-1	Cr+6, post spike	92.0 %	----	----
GP76299 §	JB53451-14	Cr+6, soluble	1.9 %	NJ-	Low
GP76299 §	JB53451-14	Cr+6, insoluble	80.0 %	---	----
GP76299 §	JB53451-14	Cr+6, post spike	50.6 %	NJ-	Low

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike.
 £ – The samples associated with QC Batch GP75798 consist of JB51750-2 through -5, JB51750-7, JB51750-10 through -14 (inclusive).
 § – The samples associated with QC Batch GP75802 consist of JB51750-16 through -22, JB51750-22 through -25, JB51750-27, and JB51750-28.
 Ø – The samples associated with QC Batch GN94224 consist of field blanks JB51750-29 and -30.

The soluble MS recovery of 1.9% was below QC limits for Cr+6 for the spiked sample from sampling location LD004 8-8.5 in the soil sample analysis in QC Batch GP76299 which was associated with 10 soil samples with lab sample IDs of JB53451-12 through -21 (inclusive). Despite the 1.9% soluble MS recovery, the results were not rejected, because the insoluble MS recovery was within QC limits, an approach found acceptable by Mr. Joseph Sanguiliano of the NJDEP.

Applying the DV guidelines that are based on SW-846 Method 7196A (NJDEP, 2005), the hexavalent chromium results for the associated ten soil samples are, consequently, qualified as estimated values and flagged with "NJ-" due to the potential low bias in the ability to recover this analyte in the soil matrix. These qualified results are presented below in Table 9.

Duplicate Sample Analysis

All duplicate analyses met QC requirements with values less than 3.0 %RPD, including Cr+6, redox potential and pH analyses, except for the 73.2%RPD for the duplicate analysis associated with samples JB53451-12 through -21. Although the 73.2%RPD for Cr+6 was above the laboratory QC limit for the duplicate analysis of sample JB53451-14 in GP76299, the value is acceptable because of the low sample concentrations which differ by less than the DV QC guideline of $\leq 2 \times \text{CRQL}$ (USEPA, 2010; USEPA, 2006) when sample concentrations are low ($< 5 \times \text{RL}$). Consequently, no sample results associated with this SDG, SDG JB53451, are subject to qualification for analytical precision issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries between 97.5% and 100.1% for the soil sample analyses, and 93.3% for the analysis associated with the field blank, thereby demonstrating acceptable analytical system performance.

Field Duplicate Analysis

The results for the analysis of one pair of field duplicate samples are presented in Table 7, below. It is evident that the results of the detected results of sample LD004 6-6.5 and its field duplicate differed by more than the QC limit of 50%RPD.

Table 7. Comparison of Field Duplicate Soil Sample Results – SDG JB53451

Analyte	LD004 6-6.5 (mg/Kg)	DUP 19 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	23.8 NJ-	58.3 NJ-	84.0 %	(J)
<p>< – The analyte was not detected at the stated reporting limit NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is not within QC limits; possible low bias. (J) – Sample result is subject to DV qualification, but not additionally flagged with "J" to avoid redundancy; CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit. $< 2 \times \text{CRQL}$ – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.</p>				

The difference between the field duplicate samples from LD004 6-6.5 was greater than the QC limit of 50%RPD (AECOM, 2010). Thus, the two results are subject to qualification. However, since the two results from LD004 6-6.5 and DUP 19 are already qualified as estimated values for the low MS recovery, no additional "J" flag was applied in order to avoid redundancy of qualifiers. No sample results need be additionally qualified for field duplicate sample results disparities.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches associated with the soil samples in this SDG. This is not a required analysis of the method.

Sample Result Verification

Sample Cr+6 concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr+6 results:

$$\text{Cr+6 (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calibration curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample KD006 5.5-6 (JB53451-1) was listed as 590 mg/Kg on the reporting form and 0.5404 mg/L on the quantitation report in the raw data for a 25-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr+6 (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr+6 (mg/Kg)} = \frac{0.5404 \text{ mg/L} \times 0.1 \text{ L} \times 25}{0.00245 \text{ Kg} \times 93.4/100} = \frac{1.351}{0.0022883} = 590.3946 \text{ mg/Kg}$$

$$\text{Cr+6 (mg/Kg)} = 590 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 590 mg/Kg for Sample KD006 5.5-6 was correctly reported. This was the highest detected Cr+6 concentration detected among the 21 soil samples of this SDG, JB53451, analyzed for hexavalent chromium. This was one of nine detected Cr+6 concentration results above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

All but four of the 21 soil samples fell below the Eh-pH phase diagram line. These results suggest that almost all of the samples experience conditions of a "reducing" soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of the four samples experiencing oxidizing conditions, the highest detected Cr+6 concentration was 590 mg/Kg in JB53451-1; the total chromium result from its ICP analysis was 1270 mg/Kg. Of the three remaining sample Cr+6 results above the Eh-pH line, samples JB53451-5 (27.5 mg/Kg Cr+6) and JB53451-18 (20.2 mg/Kg Cr+6) were above the SRS with corresponding total chromium values of 68.4 and 147 mg/Kg Cr, respectively. The fourth result above the Eh-pH line was JB53451-6 whose Cr+6 and total Cr results were 7.3 mg/Kg Cr+6 and 26.4 mg/Kg Cr.

Consequently, the three results above the SRS are expected to be remediated, while the fourth result appears to have an insufficient chromium concentration to oxidize to Cr+6 above the SRS.

Summary of Cr+6 Results in SDG JB53451

Due to the low MS recovery for the soluble spike in QC Batch GP76299, the Cr+6 results in the associated 10 soil samples are qualified as estimated values and flagged with "NJ-" due to a low soluble MS recovery. No other Cr+6 results were subject to qualification in the hexavalent chromium analyses, or the results of the pH, redox potential or total solids analyses. The Cr+6 results qualified due to low Cr+6 spike recoveries in the soluble MS analysis following the DV review are presented in Table 9 near the end of this DV report and compared to results from their reanalysis.

Because the soluble MS recovery was below QC limits in QC Batch GP76299, the samples required reanalysis where the resultant data are presented in SDG JB53451R and summarized in this report in sections below under the subsection labeled "SDG JB53451R".

SDG JB53451R

Because the soluble MS recoveries in the initial soil sample analysis for hexavalent chromium were below the QC limit of 75% for the spike recoveries associated with the ten (10) soil samples, and the post-spike recoveries were below the 85-115% QC limits, these 10 soil samples of SDG JB53451 were reanalyzed for hexavalent chromium. The soil samples numbered JB53451-12 through -21 were re-analyzed and the data submitted in a supplemental data package labeled JB53451R (R for reanalysis). The samples were re-prepped on December 9 and reanalyzed December 13, 2013 for Cr+6, within the 30-holding time for soil samples. The samples present in SDG JB53451R are identified in Table 1, but are labeled with the suffix 'R' in the laboratory sample ID number such as JB53451-12R for the reanalysis of client ID sample LD004 6-6.5, which was the sample used as the QC sample in SDG JB53451R. Hexavalent chromium was detected in six of the 10 reanalyzed soil samples, with three concentrations of 33.7, 22.1 and 24.5 mg/Kg above the SRS of 20 mg/Kg, with the remaining three detected results less than 19.5 mg/Kg.

The case narrative of SDG JB53451R indicated that the QC requirements were met for the reanalysis of the soil samples of SDG JB53451R, except that the four MS recoveries were outside QC limits, as presented in Table 8 below for JB53451-12R MS. This QC sample was associated with the 10 soil samples with laboratory ID numbers JB53451-12R through -21R.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with the value of 0.99992 a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 98.0% to 101.2% for the QC batch associated with the ten soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blank (< 0.40 mg/Kg), or any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike (MS) recovery for the soluble matrix spike was below QC limits in the re-analysis of JB53451-12R from soil sampling location LD004 6-6.5. Thus, the hexavalent chromium results for samples with laboratory sample ID numbers JB53451-12R through -21R are still subject to qualification to be flagged with "NJ-".

Table 8. Matrix Spike Recovery Results in SDG JB53451R

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76537	JB53451-12R	Cr+6, soluble	27.4 %	NJ-	Low
GP76537	JB53451-12R	Cr+6, insoluble	73.9 %	NJ-	Low
GP76537	JB53451-12R	Cr+6, post spike	69.5 %	NJ-	Low
GP76537	JB53451-12R	Cr+6, pH-adjusted post spike	76.5 %	NJ-	Low
QC Limits are 75-125% for MS Recovery; 85-115% for post spike recovery. NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike					

These qualified Cr+6 results from the reanalysis are presented alongside those of the initial analysis in Table 9. The Cr+6 results from the re-analysis are reasonably comparable to those results obtained in the initial analysis, with perhaps the results for DUP 19 affected by soil sample non-homogeneity.

Duplicate Sample Analysis

Sample JB53451-14R was analyzed in duplicate. The difference between the duplicate samples was an excellent value of 0.0 %RPD, because the concentrations were both non-detect results. Since the difference of 0%RPD was below the laboratory QC limit of 20%RPD and the 35% DV QC criterion, acceptable analytical precision was demonstrated.

The difference between Cr+6 concentrations of field duplicate samples from LD004 6-6.5 was 41.6%RPD, a value below the 50%RPD QC limit (AECOM, 2010; USEPA, 2010), thereby demonstrating acceptable sampling representativeness and precision.

Laboratory Control Sample (LCS) Analysis

The LCS recoveries were acceptable and within QC limits of 80-120%, with recoveries of ranging from 88.4% and 99.0%, thereby demonstrating acceptable analytical system performance.

Sample Result Verification

The detected hexavalent chromium concentration for Sample LD003 5.5-6 (JB53451-18R) was listed as 19.5 mg/Kg on the reporting form and 0.4516 mg/L on the quantitation report in the raw data. This is a concentration approaching the SRS of 20 mg/Kg. A calculation check provides the following result:

$$\text{Cr+6 (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr+6 (mg/Kg)} = \frac{0.4516 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00254 \text{ Kg} \times 91.2/100} = \frac{0.04516}{0.0023165} = 19.4951 \text{ mg/Kg}$$

Cr+6 (mg/Kg) = 19.5 mg/Kg

After rounding to 3 significant figures, this verifies that the hexavalent chromium concentration of 19.5 mg/Kg for Sample LD003 5.5-6 was correctly reported.

SDG JB53451RT

The reducing conditions in the soil matrix appear supported by the TOC, S⁻ screen and Fe⁺² data.

The supporting analyses (ferrous iron, sulfide screen, and TOC) were analyzed on Sample JB53451-14 (LD004 8-8.5), a sample which was analyzed twice without detecting a positive concentration of Cr+6 above 0.51 mg/Kg. The three supporting parameters were analyzed outside the respective holding times in order to provide more information about the possible impact of the sample matrix on the Cr+6 recoveries.

The detected ferrous iron (1.5%) and TOC concentration (23,000 mg/Kg) results in JB53451-14RT are at comparable levels with samples in the research literature identified as exhibiting “reducing” soil conditions (Brose and James, 2013; Jardine, et al., 1999), as also indicated on the Eh-pH phase diagram. Thus, the results of the supplemental analyses support the soil conditions being of a “reducing” environment. The “reducing” conditions in the soil matrix of a soil sample falling below the Eh-pH phase line are thereby supported by the TOC, Fe⁺² and Eh-pH data.

Summary for Hexavalent Chromium Analysis

The soil sample results from the initial analysis are presented alongside those obtained from the reanalysis of samples in SDG JB53451 below in Table 9. The Cr+6 results of the reanalysis appear to be comparable to those from the of the initial analysis, both associated with low MS recoveries and possibly suggesting a potential low bias in the ability to recover this analyte in the given sample matrix.

Table 9. Comparison of JB53451 Sample Cr+6 Results Qualified For Low MS Recoveries

Client ID	Lab Sample ID	Analyte	JB53451 Result (mg/Kg)	DV Qualifier	JB53451R Result (mg/Kg)	DV Qualifier
LD004 6-6.5	JB53451-12	Cr+6	23.8	NJ-	33.7	NJ-
LD004 7-7.5	JB53451-13	Cr+6	4.4	NJ-	13.8	NJ-
LD004 8-8.5	JB53451-14	Cr+6	0.56	NJ-	< 0.50	NJ-
LD004 9-9.5	JB53451-15	Cr+6	1.1	NJ-	< 0.51	NJ-
DUP 19	JB53451-16	Cr+6	58.3	NJ-	22.1	NJ-
LD003 4.5-5	JB53451-17	Cr+6	27.4	NJ-	24.5	NJ-
LD003 5.5-6	JB53451-18	Cr+6	20.2	NJ-	19.5	NJ-
LD003 6.5-7	JB53451-19	Cr+6	0.45	NJ-	< 0.45	NJ-
LD003 7.5-8	JB53451-20	Cr+6	0.85	NJ-	< 0.49	NJ-
LD003 8.5-9	JB53451-21	Cr+6	< 0.49	NJ-	0.51	NJ-

NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; possible low bias.
 < – The analyte was analyzed for, but not detected at the specified reporting limit.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	Results are estimated and the data are valid for limited purposes. The results are qualitatively acceptable.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

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ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53451

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No

Indicate the identity of the samples and why. *Matrix interference for metals analysis and high Cr⁺⁶ concentrations above calibration range.*

(2x) JB 53451 - 4, 10, 14, 15, 19. Cr⁺⁶: (25x) JB 53451 - 1.

(4x) JB 53451 - 3, 6, 11, 13, 16. (10x) JB 53451 - 2, 3,

(5x) JB 53451 - 1, 17. (2x) JB 53451 - 16.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

One antimony: JB 53451-13

one nickel and vanadium: JB 53451-1

Nine Cr⁺⁶ results: JB 53451-1, 2, 3, 5, 11, 12, 16, 17, 18.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No problems with analytical procedure were noted.

JB 53451

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No

Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 6, 7, and 8 for details.

Qualified sample results are presented in tables 5 and 9 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB53603/JB53603R/JB53603RT/
and JB53603T

Sample Date: November 18 and 19, 2013

Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97

Reviewer: Janis V. Giga. Ph.D., REP5554

Report Date: February 19, 2014

This data validation (DV) report presents the data review and result qualifications for twenty-eight (28) soil samples and one (1) field blank (FB) collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 18-19, 2013 for sample delivery group (SDG) JB53603. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast, Inc. in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53603 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 28 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53603-1 through -6 (inclusive), JB53603-8 through -11, JB53603-13 through -18 (inclusive), and JB53603-20 through -25 (inclusive);
- Antimony (*ENJ-) in Samples JB53603-7, and JB53603-26 through -29;
- Antimony (*NJ-) in Sample JB53603-12;
- Antimony (NJ-) in the reanalyzed of Sample JB53603-29T;

- Chromium, nickel and vanadium (EJ) in Samples JB53603-1, -3, and -4;
- Chromium (NJ+) in Samples JB53603-2, -5, -6, JB53603-8 through -11, JB53603-13 through -18, and JB53603-20 through -25 (inclusive);
- Chromium (*EJ) in Samples JB53603-7, -12, and JB53603-26 through 29 (inclusive);

- Nickel (*NJ) in Samples JB53603-7, and JB53603-26 through 29 (inclusive);
- Nickel (*ENJ+) in Sample JB53603-12;
-
- Vanadium (*J) in Samples JB53603-7, and JB53603-26 through 29 (inclusive);
- Vanadium (*ENJ+) in Sample JB53603-12;

- Hexavalent chromium (NJ-) in Samples JB53603-1 through -5 (inclusive), JB53603-20 through -29 (inclusive);
- Hexavalent chromium (*NJ-) in Samples JB53603-6 through -18 (inclusive);
- Hexavalent chromium (NJ-) in reanalyzed samples JB53603-1R through -5R (inclusive), and JB53603-20R through -29R (inclusive);
- Hexavalent chromium (J) in field duplicate samples JB53603-14R and JB53603-18R;

No other sample results in SDG JB53603 required qualification. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for 9 hexavalent chromium (Cr+6) results, eight nickel results, four vanadium and one antimony result. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were subject to qualification following the DV review are presented in Tables 7, 12, and 14 of this DV report.

Sample Receipt

The twenty-eight (28) soil samples and one (1) field blank collected November 18-19, 2013 were received at the Accutest laboratory on November 19, 2013 with acceptable sampling cooler temperatures of 3.2°C. The samples destined for metals analysis were received at the Accutest Laboratory SE in Orlando, Florida November 21, 2013 preserved and intact with sampling cooler temperatures of 2.6°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
KD004 5-5.5	JB53603-1	11/18/13	Soil	Metals, Cr+6
KD004 6-6.5	JB53603-2	11/18/13	Soil	Metals, Cr+6
KD004 6-6.5	JB53603-2D	11/18/13	Soil	Metals, Cr+6
KD004 6-6.5	JB53603-2S	11/18/13	Soil	Metals, Cr+6
KD004 7-7.5	JB53603-3	11/18/13	Soil	Metals, Cr+6
KD004 8-8.5	JB53603-4	11/18/13	Soil	Metals, Cr+6
KD004 9-9.5	JB53603-5	11/18/13	Soil	Metals, Cr+6
LD008A 4-4.5	JB53603-6	11/19/13	Soil	Metals, Cr+6
LD008A 5-5.5	JB53603-7	11/19/13	Soil	Metals, Cr+6
LD008A 5-5.5	JB53603-7D	11/19/13	Soil	Metals, Cr+6
LD008A 5-5.5	JB53603-7S	11/19/13	Soil	Metals, Cr+6
LD008A 6-6.5	JB53603-8	11/19/13	Soil	Metals, Cr+6
LD008A 7-7.5	JB53603-9	11/19/13	Soil	Metals, Cr+6
LD008A 8-8.5	JB53603-10	11/19/13	Soil	Metals, Cr+6
ID011A 0.5-1	JB53603-11	11/19/13	Soil	Metals, Cr+6
LD011A 2-2.5	JB53603-12	11/19/13	Soil	Metals, Cr+6
LD011A 2-2.5	JB53603-12D	11/19/13	Soil	Metals, Cr+6
LD011A 2-2.5	JB53603-12S	11/19/13	Soil	Metals, Cr+6
JD002 3-3.5	JB53603-13	11/19/13	Soil	Metals, Cr+6
JD002 4-4.5	JB53603-14	11/19/13	Soil	Metals, Cr+6
JD002 5-5.5	JB53603-15	11/19/13	Soil	Metals, Cr+6

JD002 6-6.5	JB53603-16	11/19/13	Soil	Metals, Cr+6
JD002 7-7.5	JB53603-17	11/19/13	Soil	Metals, Cr+6
DUP 20	JB53603-18	11/19/13	Soil	Metals, Cr+6
FB 14	JB53603-19	11/19/13	Aqueous	Metals, Cr+6
ID011A 4-4.5	JB53603-20	11/19/13	Soil	Metals, Cr+6
ID011A 6-6.5	JB53603-21	11/19/13	Soil	Metals, Cr+6
ID011A8-8.5	JB53603-22	11/19/13	Soil	Metals, Cr+6
JD003A 5-5.5	JB53603-23	11/19/13	Soil	Metals, Cr+6
JD003A 6-6.5	JB53603-24	11/19/13	Soil	Metals, Cr+6
JD003A 7-7.5	JB53603-25	11/19/13	Soil	Metals, Cr+6
JD003A 10-10.5	JB53603-26	11/19/13	Soil	Metals, Cr+6
JD003A 11-11.5	JB53603-27	11/19/13	Soil	Metals, Cr+6
LD001 2-2.5	JB53603-28	11/19/13	Soil	Metals, Cr+6
LD001 4-4.5	JB53603-29	11/19/13	Soil	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories SE in Orlando, FL. Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB53603, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) *“National Functional Guidelines for Inorganic Data Review”*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Field duplicate sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Several sample results exhibited concentrations above the respective site remediation standard (SRS) in some of the 28 soil samples of this SDG. These included eight nickel results that exceeded the SRS of 31 mg/Kg, four vanadium results above 78 mg/Kg, and one antimony result above its SRS of 6 mg/Kg.

Laboratory Case Narrative

The extensive case narrative identified all analytes for the samples that were diluted, listing them individually by analyte in random fashion. Matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in QC Batch MP26450. The case narrative stated that the RPDs for antimony, nickel and thallium between the spiked duplicates were outside QC limits in this QC batch; however, the values were below the data quality QC limit of 35%RPD for soil samples. The serial dilution results in this SDG were outside QC limits for chromium, nickel and vanadium and probably due to sample non-homogeneity. In separate statements, the case narrative stated that these differences indicate possible matrix interference.

In QC Batch MP26451, the MS recoveries for antimony and vanadium were outside QC limits, while the MSD recoveries for antimony and chromium were outside QC limits, indicating possible matrix interference. However, the MS recovery for vanadium was actually within the DV QC limits of 75-125%, thereby indicating an acceptable spike recovery.

The MS/MSD recoveries for antimony and nickel were outside QC limit, as were the chromium and vanadium recoveries in QC Batch MP26455. However, because the sample concentrations of chromium and vanadium were more than four times the spike amount, the chromium and vanadium results are not subject to qualification. There were large differences between the recovered spike concentrations for antimony, chromium, nickel, and vanadium. The case narrative stated that the RPD(s) for antimony and chromium in the serial dilution analysis were outside QC limits, but that the percent difference values were acceptable due to low initial sample concentration (< 50 times IDL). However, this statement is not correct, since both the antimony and chromium initial concentrations were clearly greater than 50 times the IDL.

In QC Batch MP26456, the MS/MSD recoveries for antimony, nickel and vanadium were identified as being outside QC limits, indicating possible matrix interference. However, the MSD recovery for nickel was actually within the DV QC limits of 75-125%, thereby indicating an acceptable spike recovery. The RPDs for antimony, chromium, nickel, and vanadium were outside QC limits for the duplicate analysis, due to possible sample non-homogeneity. The case narrative identified the

serial dilution results being outside QC limits in QC Batch MP26456 for antimony, chromium, nickel, and vanadium and stated that the percent difference values were acceptable due to low initial sample concentration (<50 times IDL). However, the case narrative also stated that the serial dilution results for each of the affected metals (chromium, nickel, and vanadium) indicated possible matrix interference, thus appearing to be conflicting statements.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the internal standard area counts identified below in MA11248, and the low closing CRDL standard recovery for antimony in analytical sequence MA11253.

The exceptions included the internal standard area count for IS#2 which is associated with chromium and vanadium in analytical run MA11238 for sample JB53603-17. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Consequently, the IS recovery in the affected sample in MA11248, JB53603-17 (125.5%), was less than 130% and apparently, therefore, not reanalyzed, as the IS area counts are considered acceptable by the laboratory representatives.

The closing CRDL standard (CRIA2) recovery for antimony was 68%, a value below the DV QC limits of 70-130%. There was only one PPG sample analyzed in the affected sequence, JB53603-12. Since antimony was detected at a concentration above the affected range (true \pm CRQL), the antimony concentration in JB53603-12 was not subject to qualification (USEPA, 2010).

Hence, no soil sample results warranted qualification for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53603.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis (QC Limits 75-125% Recovery; \leq 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony in QC batches for soil samples were below QC limits in the four QC batches associated with all 28 soil samples, as summarized in Table 2 below. The MSD recovery for chromium in QC Batch MP26451 was above the QC limits of 75 - 125% for QC sample JB53603-2, while the MS/MSD recovery for vanadium and MS recovery for nickel in QC Batch MP26456 were also above the QC limits, as summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. The MS/MSD recoveries for nickel in QC sample displayed confounding results, with the MS recovering below QC limits and the MSD considerably above QC limits. The fact that

the initial sample concentration was almost four times the spike value (3.8 times greater) may have led to some masking of the spike and possibly contributing to the observed resultant conflicting results. Consequently, as there is no clear-cut bias demonstrated by the MS/MSD analyses for nickel, the soil sample nickel results associated with QC Batch MP26455 are qualified as estimated values, but only flagged with "NJ", as there is no definitive bias direction. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26450 Ω	FA10141-8	Antimony	38.2 %	34.1 %	NJ-	Low
MP26451 †	JB53603-2	Antimony	27.1%	35.1 %	NJ-	Low
MP26451 †	JB53603-2	Chromium	95.2 %	136.6 %	NJ+	High
MP26455 £	JB53603-7	Antimony	26.2 %	50.2 %	NJ-	Low
MP26455 £	JB53603-7	Nickel	-29.8 %	238.0 %	NJ	Low/High
MP26456 §	JB53603-12	Antimony	72.5 %	40.7%	NJ-	Low
MP26456 §	JB53603-12	Nickel	520.1 %	124.7 %	NJ+	High
MP26456 §	JB53603-12	Vanadium	568.8%	174.1 %	NJ+	High

QC Limits are 75-125%; Post-digestion spike QC is 80-120%

NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.

NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.

NJ – The matrix spike recovery was outside QC limits; associated sample results are estimated values with indeterminate bias.

MS – Matrix spike

MSD – Matrix spike duplicate

Ω – The samples associated with QC Batch MP26450 consist of JB53603-1, 53603-3 and -4.

† – The samples associated with QC Batch MP26451 consist of JB53603-2, -5, -6, -8 through -11, JB53603-13 through -18 inclusive, and JB53603-20 through -25 (inclusive).

£ – The samples associated with QC Batch MP26455 consist of JB53603-7, and JB53603-26 through -29 (inclusive).

§ – The sample associated with QC Batch MP26456 consists of JB53603-12.

Since none of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits, the sample results subject to qualification for low spike recoveries were flagged with "N" following the DV review to indicate that the result is associated with QC recovery outside QC limits and further flagged with either "J+" or "J-" to indicate the possible presence of a possible high or low bias in the ability to recover the particular analyte in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002), except for the nickel results of QC Batch MP26455, as explained above.

These qualified results are presented below in summary table, Table 7 together with the results qualified for duplicate analysis disparities and serial dilution analysis results.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate soil sample analysis was performed on five QC samples and on five pairs of spiked duplicate samples. Most %RPD values were below the QC limit of 35%RPD for soil samples and the associated results did not require qualification. The duplicate and spike duplicate results in the

QC batch associated with the field blank were also within the 20%RPD QC limits for aqueous samples.

The case narrative stated that the RPDs for antimony, nickel and thallium between the spiked duplicates in QC Batch MP26450 were outside [laboratory] QC limits in this QC batch; however, the values were below the data quality QC limit of 35%RPD for soil samples and, therefore, the associated soil sample results are not subject to qualification. There were large differences between the recovered spike concentrations for antimony, chromium, nickel, and vanadium in QC Batch MP26455. Although the spike amounts differed slightly between the MS and MSD analyses for the QC samples, the differences in the recovered concentrations were large compared to these spike differences that cannot be attributed to the spike differences alone. Consequently it was judged appropriate to qualify the sample results associated with the disparities in the spiked duplicate results of QC Batch MP26455 as estimated values and flag the results with “*J”, as would be done if the duplicate analysis results were outside QC limits.

In QC Batch MP26456, the RPDs for antimony, chromium, nickel, and vanadium were outside QC limits for the duplicate analysis, due to possible sample non-homogeneity.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Duplicate Difference	DV Qualifier
MP26456 §	JB53603-12	Antimony	116.3 %RPD	*J
MP26456 §	JB53603-12	Chromium	109.9 % RPD	*J
MP26456 §	JB53603-12	Nickel	125.8 %RPD	*J
MP26456 §	JB53603-12	Vanadium	129.2 %RPD	*J
QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	
MP26455 £	JB53603-7	Antimony	36.8 %RPD	*J
MP26455 £	JB53603-7	Chromium	52.4 % RPD	*J
MP26455 £	JB53603-7	Nickel	55.9 %RPD	*J
MP26455 £	JB53603-7	Vanadium	80.0 %RPD	*J
QC Limit is 35%RPD; * – Duplicate analysis not within control limits; indeterminate bias direction. J – The reported result is an estimated value. § – The samples associated with QC Batch MP26456 consists of JB53603-12; £ – The samples associated with QC Batch MP26455 consist of JB53603-7, and JB53603-26 through -29 (inclusive).				

Thus, the antimony, chromium, nickel, and vanadium results associated with the duplicate results in QC Batch MP26456 and the spiked duplicate results associated with QC Batch MP26455 are qualified as estimated values and are to be flagged with “*J” due to the potential variability in the analytical precision, though without exhibiting any clear bias direction. When the “*J” qualifiers are combined with the qualifiers associated with the MS/MSD recoveries outside QC limits presented in Table 2, and the serial dilution analysis summarized in Table 4, the sample results with the assigned qualifier designations appear with either “*J”, “*EJ”, “*NJ-”, “ENJ-”, “ENJ+” or “*NJ” in the summary table, Table 7. The duplicate analyses in the remaining QC batches demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 94.2% - 109.2%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified several serial dilution results as being outside QC limits in SDG JB53603. In QC Batch MP26450, chromium, nickel, and vanadium were identified as being outside QC limits, likely due to sample non-homogeneity. These are detailed in Table 4 below.

The case narrative stated that the RPD(s) for antimony and chromium in the serial dilution analysis in MP26455 were outside QC limits, but that the percent difference values were acceptable due to low initial sample concentration (< 50 times IDL). However, this statement is not correct, since both the antimony and chromium initial concentrations were clearly greater than 50 times the IDL and are, therefore, subject to qualification.

The case narrative identified the serial dilution results being outside QC limits in QC Batch MP26456 for antimony, chromium, nickel, and vanadium and stated that the percent difference values were acceptable due to low initial sample concentration (<50 times IDL). However, the case narrative also stated that the serial dilution results for each of these affected metals (chromium, nickel and vanadium) indicated possible matrix interference, a conflicting statement. It seems that the statement regarding the acceptable percent difference results applied only to antimony.

Table 4. Serial Dilution Results Outside QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26450 Ω	FA10141-8	Chromium	14.8 %D	EJ
MP26450 Ω	FA10141-8	Nickel	14.0 %D	EJ
MP26450 Ω	FA10141-8	Vanadium	12.1 %D	EJ
MP26455 £	JB53603-7	Antimony	14.9 %D	EJ
MP26455 £	JB53603-7	Chromium	11.3 %D	EJ
MP26456 §	JB53603-12	Chromium	28.9 %D	EJ
MP26456 §	JB53603-12	Nickel	29.0 %D	EJ
MP26456 §	JB53603-12	Vanadium	26.2 %D	EJ

EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26450 consist of JB53603-1, 53603-3 and -4;
£ – The samples associated with QC Batch MP26455 consist of JB53603-7, and JB53603-26 through -29 (inclusive);
§ – The samples associated with QC Batch MP26456 consists of JB53603-12.

The associated antimony, chromium, nickel, and vanadium results in samples with the identified laboratory sample ID numbers presented in Table 4, are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 7, along with the results qualified for low matrix spike recoveries and variability suggested by the duplicate analysis results.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

One set of field duplicate samples was collected as part of SDG JB53603. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying results from the USEPA CLP program for soil samples analyzed by ICP-AES using the CLP Statement of Work (SOW) ISM01.X (but not Method 6010C) that differ by more than 50%RPD or $> 2 \times$ CRQL (USEPA, 2010; AECOM, 2010).

The results for the analysis of the one pair of field duplicate samples are presented in Table 5, below. It is evident that the results for the metals analytes that were detected in the field duplicate samples were very similar and, thus, considered representative, as the concentrations between field duplicate samples differed by less than 12 %RPD or differed by less than two times the reporting limit value ($< 2 \times$ CRQL) for all analyte pairs, thereby meeting the QC limits for field duplicate samples and demonstrating very good sampling representativeness and precision.

Table 5. Comparison of Field Duplicate Soil Sample Results – SDG JB53603

Analyte	JD002 4-4.5 (mg/Kg)	DUP 20 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.8 NJ-	< 4.4 NJ-	< 2 × CRQL	-
Chromium	19.0 NJ+	20.4 NJ+	7.1 %	-
Nickel	14.6	14.4	1.4 %	-
Thallium	< 2.4	< 2.2	< 2 × CRQL	-
Vanadium	26.7	30.0	11.6 %	-

< – The analyte was not detected at the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
 NJ+ – The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
 CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit.
 $< 2 \times$ CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

This pair of field duplicate samples demonstrated acceptable sampling representativeness and precision for the five target metals analyzed.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported vanadium results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where:
- C = Raw instrument reading (µg/L)
 - V = final volume (mL)
 - DF = Dilution factor
 - W = wet weight (g)
 - TS = Total solids (%)
 - 1000 = conversion factor (mL/L)

The vanadium concentration for Sample JD003A 5-5.5 (JB53603-23) was listed as 212 mg/Kg on the reporting form and 4.495 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(4,495 \mu\text{g/L})(50 \text{ mL}) (1)}{1000(\text{mL/L}) (1.12 \text{ g}) (94.6\%/100\%)} = 212.1244 \mu\text{g/g}$$

$$= 212 \text{ mg/Kg dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 212 mg/Kg for Sample JD003A 5-5.5 was correctly reported. This value is above the SRS of 78 mg/Kg. Vanadium was detected in three other samples above the SRS criterion.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 22 of the 28 soil samples that had been diluted by a factor of either two, four, five, or ten.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exceptions were instances where two samples were diluted by a factor of 10× and 5×, thereby raising the reporting limit for the antimony and thallium results above the respective SRS, as presented below in Table 6, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 6. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
ID011A 4-4.5	JB53603-20	Antimony	< 0.99	10	< 9.9 NJ-	6
ID011A 4-4.5	JB53603-20	Thallium	< 0.50	10	< 5.0	3
JD003A 5-5.5	JB53603-23	Thallium	< 0.48	5	< 4.8	6

Units – mg/Kg
 < - The analyte was analyzed for, but was not detected above the stated reporting limit.
 NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

The other analyte results associated with the non-detect soil results of antimony and thallium in JB53603-20 were all considerably below the respective SRS values, including the 1.0 mg/Kg Cr+6 result, thereby suggesting a relatively “clean” sample.

The interpretation of the thallium result in JB53603-23 (<4.8) was not compromised by the applied dilution, because the nickel (86.6 mg/Kg), vanadium (212 mg/Kg) and hexavalent chromium (659 mg/Kg) results in JB53603-23 were all above the respective SRS value and, thus, potentially subject to some sort of response action or further evaluation.

Summary

The soil sample analytical results for the samples of SDG JB53603 were found to be compliant with the analytical methods for the analysis of metals in the twenty-eight soil samples using SW-846 Method 6010C.

The QC criteria were met for the ICP target analyte analyses, except for the low matrix spike recoveries, differences in the duplicate analysis and the serial dilution analysis, as summarized in Tables 2, 3, and 4. The associated sample results are qualified accordingly and listed in Table 7 below.

Table 7. Summary of Qualified Sample Metals Results in SDG JB53603

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
KD004 5-5.5	JB53603-1	Antimony	< 4.6	NJ-
KD004 5-5.5	JB53603-1	Chromium	204	EJ
KD004 5-5.5	JB53603-1	Nickel	24.1	EJ
KD004 5-5.5	JB53603-1	Vanadium	69.4	EJ
KD004 6-6.5	JB53603-2	Antimony	< 1.8	NJ-
KD004 6-6.5	JB53603-2	Chromium	20.2	NJ+
KD004 7-7.5	JB53603-3	Antimony	< 1.8	NJ-
KD004 7-7.5	JB53603-3	Chromium	13.8	EJ
KD004 7-7.5	JB53603-3	Nickel	33.6	EJ
KD004 7-7.5	JB53603-3	Vanadium	18.8	EJ
KD004 8-8.5	JB53603-4	Antimony	< 4.7	NJ-
KD004 8-8.5	JB53603-4	Chromium	14.1	EJ
KD004 8-8.5	JB53603-4	Nickel	21.6	EJ
KD004 8-8.5	JB53603-4	Vanadium	19.4	EJ
KD004 9-9.5	JB53603-5	Antimony	< 4.2	NJ-
KD004 9-9.5	JB53603-5	Chromium	11.2	NJ+
LD008A 4-4.5	JB53603-6	Antimony	< 4.5	NJ-
LD008A 4-4.5	JB53603-6	Chromium	35.1	NJ+
LD008A 5-5.5	JB53603-7	Antimony	6.5	*ENJ-
LD008A 5-5.5	JB53603-7	Chromium	1240	*EJ
LD008A 5-5.5	JB53603-7	Nickel	85.5	*NJ
LD008A 5-5.5	JB53603-7	Vanadium	146	*J
LD008A 6-6.5	JB53603-8	Antimony	< 1.8	NJ-
LD008A 6-6.5	JB53603-8	Chromium	44.9	NJ+
LD008A 7-7.5	JB53603-9	Antimony	< 3.5	NJ-
LD008A 7-7.5	JB53603-9	Chromium	18.7	NJ+
LD008A 8-8.5	JB53603-10	Antimony	< 5.4	NJ-
LD008A 8-8.5	JB53603-10	Chromium	7.5	NJ+
ID011A 0.5-1	JB53603-11	Antimony	0.90	NJ-
ID011A 0.5-1	JB53603-11	Chromium	148	NJ+
LD011A 2-2.5	JB53603-12	Antimony	1.8	*NJ-
LD011A 2-2.5	JB53603-12	Chromium	237	*EJ
LD011A 2-2.5	JB53603-12	Nickel	26.4	*ENJ+
LD011A 2-2.5	JB53603-12	Vanadium	41.7	*ENJ+
JD002 3-3.5	JB53603-13	Antimony	< 0.91	NJ-
JD002 3-3.5	JB53603-13	Chromium	10.7	NJ+
JD002 4-4.5	JB53603-14	Antimony	< 4.8	NJ-
JD002 4-4.5	JB53603-14	Chromium	19.0	NJ+
JD002 5-5.5	JB53603-15	Antimony	< 1.9	NJ-
JD002 5-5.5	JB53603-15	Chromium	152	NJ+
JD002 6-6.5	JB53603-16	Antimony	< 5.3	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
JD002 6-6.5	JB53603-16	Chromium	46.0	NJ+
JD002 7-7.5	JB53603-17	Antimony	< 0.95	NJ-
JD002 7-7.5	JB53603-17	Chromium	13.2	NJ+
DUP 20	JB53603-18	Antimony	< 4.4	NJ-
DUP 20	JB53603-18	Chromium	20.4	NJ+
ID011A 4-4.5	JB53603-20	Antimony	< 9.9	NJ-
ID011A 4-4.5	JB53603-20	Chromium	12.1	NJ+
ID011A 6-6.5	JB53603-21	Antimony	9.2	NJ-
ID011A 6-6.5	JB53603-21	Chromium	1130	NJ+
ID011A8-8.5	JB53603-22	Antimony	< 3.7	NJ-
ID011A8-8.5	JB53603-22	Chromium	33.1	NJ+
JD003A 5-5.5	JB53603-23	Antimony	9.5	NJ-
JD003A 5-5.5	JB53603-23	Chromium	1200	NJ+
JD003A 6-6.5	JB53603-24	Antimony	< 3.8	NJ-
JD003A 6-6.5	JB53603-24	Chromium	348	NJ+
JD003A 7-7.5	JB53603-25	Antimony	< 1.0	NJ-
JD003A 7-7.5	JB53603-25	Chromium	24.3	NJ+
JD003A 10-10.5	JB53603-26	Antimony	< 4.4	*ENJ-
JD003A 10-10.5	JB53603-26	Chromium	155	*EJ
JD003A 10-10.5	JB53603-26	Nickel	24.8	*NJ
JD003A 10-10.5	JB53603-26	Vanadium	43.1	*J
JD003A 11-11.5	JB53603-27	Antimony	< 1.1	*ENJ-
JD003A 11-11.5	JB53603-27	Chromium	15.5	*EJ
JD003A 11-11.5	JB53603-27	Nickel	13.8	*NJ
JD003A 11-11.5	JB53603-27	Vanadium	16.1	*J
LD001 2-2.5	JB53603-28	Antimony	< 4.5	*ENJ-
LD001 2-2.5	JB53603-28	Chromium	808	*EJ
LD001 2-2.5	JB53603-28	Nickel	38.1	*NJ
LD001 2-2.5	JB53603-28	Vanadium	87.8	*J
LD001 4-4.5	JB53603-29	Antimony	6.1	*ENJ-
LD001 4-4.5	JB53603-29	Chromium	1070 HH	*EJ
LD001 4-4.5	JB53603-29	Nickel	181	*NJ
LD001 4-4.5	JB53603-29	Vanadium	21.4	*J

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- J – Indicates an estimated value.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J+ – The result is an estimated value, but the result may be biased high.
- J- – The result is an estimated value, but the result may be biased low.
- * – Duplicate analysis not within control limits; indeterminate bias direction.
- E – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one QC batch for the single field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|-----------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Field Duplicate Sample analysis |
| √ Data package completeness | √ Quantitation checks |
| √ Data qualifiers | |

Hexavalent chromium was detected in nineteen of the 28 soil samples, with nine concentrations exceeding the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that the QC requirements were met, including the holding time, method blanks, and matrix spike recoveries, except for the low MS recoveries in QC Batch GP76330. The soluble MS recovery and the post-spike and pH-adjusted post-spike recoveries for QC Batch GP76330 were outside QC limits. The soluble MS recovery in QC Batch GP76332 was outside QC limits but the soluble spike amount was low relative to the sample amount. The RPD for the duplicate analysis in QC Batch GP76332 was outside QC limits, due to possible sample non-homogeneity.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values all exceeding 0.99982 values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 94.3% to 102.4% for the two QC batches associated with the 29 soil samples, and 98.3% to 101.4% for the QC batch associated with the field blank sample, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination. Hexavalent chromium was not detected in the field blank at a reporting limit of 0.010 mg/L.

Matrix Spike Analysis

The matrix spike recoveries were within the QC limits of 75-125%, except for the soluble MS recovery for JB53603-12 in QC Batch GP76332 and the soluble MS, post spike and pH-adjusted post spike recoveries in QC Batch GP76330. The soluble MS recovery for sample JB53603-7 in QC Batch GP76332 was 587.7%, a value considerably above the QC limits. However, since the initial Cr+6 concentration in JB53603-7 was more than four times the spike value, the associated sample results were not subject to qualification, because the low spike amount may have been masked by the sample amount, thereby potentially affecting the spike recovery (NJDEP, 2005).

The low soluble matrix spike recoveries for hexavalent chromium below the QC limits of 75-125% for batch QC Samples JB53603-2 and JB53603-12 indicate possible matrix interference. The other matrix spike recoveries that were within the respective QC limits, are also presented in the summary table, Table 8.

Table 8. Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76330 ¥	JB53603-2	Cr ⁺⁶ , soluble	23.6 %	NJ-	Low
GP76330 ¥	JB53603-2	Cr ⁺⁶ , insoluble	87.8 %	----	----
GP76330 ¥	JB53603-2	Cr ⁺⁶ , post spike	74.9 %	NJ-	Low
GP76330 ¥	JB53603-2	Cr ⁺⁶ , pH-adjusted post spike	78.3 %	NJ-	Low
GP76332 ø	JB53603-7	Cr ⁺⁶ , soluble	578.7 %	****	****
GP76332 ø	JB53603-7	Cr ⁺⁶ , insoluble	119.8 %	---	----
GP76332 ø	JB53603-7	Cr ⁺⁶ , post spike	98.7 %	----	----
GP76332 ø	JB53603-12	Cr ⁺⁶ , soluble	11.2 %	NJ-	Low
GP76332 ø	JB53603-12	Cr ⁺⁶ , insoluble	88.7 %	---	----
GP76332 ø	JB53603-12	Cr ⁺⁶ , post spike	97.1 %	----	----
GN95298 Ø	JB53596-2	Cr ⁺⁶ , soluble	86.7 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 ¥ – The samples associated with QC Batch GP76330 consist of JB53603-1 through -5, and JB53603-20 through -29 (inclusive).
 ø – The samples associated with QC Batch GP76332 consist of JB53603-6 through -18 (inclusive);
 Ø – The sample associated with QC Batch GN95298 consists of field blank JB53603-19.
 **** – The sample concentration was > 4 × spike amount; associated sample results are not subject to qualification.

The soluble MS recovery of 23.6% was below QC limits for Cr⁺⁶ for the spiked sample from sampling location KD004 6-6.5 in the soil sample analysis in QC Batch GP76330 which was associated with 15 soil samples with lab sample IDs of JB53603-1 through -5, and JB53603-20 through -29 inclusive). Despite the 23.6% in GP76330 and the 11.2% soluble MS recovery in GP76332, the results were not rejected, but qualified as estimated values flagged with “NJ-” because the insoluble MS recoveries were within QC limits, an approach found acceptable by Mr. Joseph Sanguiliano of the NJDEP.

In consideration of the DV guidelines that are based on SW-846 Method 7196A (NJDEP, 2005), the hexavalent chromium results for the associated twenty-eight soil samples are, consequently, qualified as estimated values and flagged with “NJ-” due to the potential low bias in the ability to recover this analyte in the soil matrix. These qualified results are presented below in Table 12.

Duplicate Sample Analysis

The duplicate sample analysis was performed on three samples where the differences among the Cr+6, pH, and redox potential were less than 25.4%RPD, except for the 36.1%RPD result in QC sample JB53603-12 in QC Batch GP76332, as depicted in Table 9.

The 36.1%RPD for Cr⁺⁶ was above laboratory QC limits (20%RPD) for the duplicate analysis of Sample JB53603-12 in QC Batch GP76332, but was also above the advisory DV QC guideline of 35%RPD for soil samples (USEPA, 2010; USEPA, 2012). Consequently, the Cr+6 results in the associated samples with laboratory sample ID numbers ranging JB53603-6 through -18 (inclusive) were qualified as estimated values and flagged with ‘*J’ due to a possible variability in the analytical precision. The ‘*’ flag is to indicate that the duplicate analysis of the QC samples were outside QC limits.

Table 9. Duplicate Sample Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
GP76332 ϕ	JB53603-12	Hexavalent Chromium	36.1 %RPD	*J
QC Limit is 35%RPD; J – The reported result is an estimated value. * – Duplicate analysis not within control limits; indeterminate bias direction. ϕ – The samples associated with QC Batch GP76332 consist of JB53603-6 through -18 (inclusive).				

The other duplicate analyses met QC requirements with values less than 25.4 %RPD, including Cr+6, redox potential and pH analyses. The qualified results are identified in the summary table presented at the end of this DV report in Table 12.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries between 97.5% and 100.1% for the soil sample analyses, and 93.3% for the analysis associated with the field blank, thereby demonstrating acceptable analytical system performance.

Field Duplicate Analysis

The results for the analysis of one pair of field duplicate samples are presented in Table 10, below. It is evident that the results of the two non-detected results of sample JD002 4-4.5 and its field duplicate were identical non-detect values with the same reporting limit, thereby meeting the QC limit of $\leq 2 \times$ CRQL (AECOM, 2010; USEPA, 2010).

Table 10. Comparison of Field Duplicate Soil Sample Results – SDG JB53603

Analyte	JD002 4-4.5 (mg/Kg)	DUP 20 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	< 0.44 NJ-	< 0.44 NJ-	< 2 \times CRQL	-
< – The analyte was not detected at the stated reporting limit NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is not within QC limits; possible low bias. CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit. < 2 \times CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.				

The difference between the non-detect results of field duplicate samples from JD002 4-4.5 was obviously less than the QC limit of $< 2 \times$ CRQL (AECOM, 2010). Thus, the two results are not qualified and demonstrate excellent sampling representativeness and precision.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample LD008A 5-5.5 (JB53603-7) was listed as 710 mg/Kg on the reporting form and 0.3419 mg/L on the quantitation report in the raw data for a 50-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.3419 \text{ mg/L} \times 0.1 \text{ L} \times 50}{0.00256 \text{ Kg} \times 94.1/100} = \frac{1.7095}{0.0024090} = 709.6423 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 710 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 710 mg/Kg for Sample LD008A 5-5.5 was correctly reported. This was the highest detected Cr+6 concentration detected among the 28 soil samples of this SDG, JB53603 analyzed for hexavalent chromium. This was one of nine detected Cr+6 concentrations result above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

All but seven of the 28 soil samples fell below the Eh-pH phase diagram line. These results suggest that most of the samples experience conditions of a "reducing" soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of the seven samples experiencing "oxidizing" conditions, the highest detected Cr+6 concentration was 710 mg/Kg in JB53603-7; the total chromium result from its ICP analysis was 1240 mg/Kg. Of the six remaining sample Cr+6 results above the Eh-pH line, each exhibited a Cr+6 result above the SRS with corresponding total chromium values ranging from 148 to 1200 mg/Kg Cr. Consequently, the seven results above the SRS are expected to be remediated or further evaluated.

Summary of Cr+6 Results in SDG JB53603

Due to the low MS recoveries for the soluble spike in QC batches GP76330 and GP76332 associated with 28 soil samples, the Cr⁺⁶ results in the associated 28 soil samples are qualified as estimated values and flagged with "NJ-" due to a low soluble MS recovery. Samples JB53603-6 through -18 (inclusive) were also qualified because the duplicate analysis result was above QC limits. These results when combined with the qualification for the low MS recovery are found flagged with "*NJ-" in comprehensive Table 12. No other Cr+6 results were subject to qualification

in the hexavalent chromium analyses, or the pH, redox potential or total solids analyses. The Cr+6 results qualified due to low Cr⁺⁶ spike recoveries in the soluble MS analysis following the DV review are presented in Table 12 near the end of this DV report and compared to results from their reanalysis.

Because the soluble MS recovery values were below QC limits in QC batches GP76330 and GP76332, the samples required reanalysis where the resultant data are presented in SDG JB53603R and summarized in this report in sections below under the subsection labeled "SDG JB53603R".

SDG JB53603R

Because the soluble MS recoveries in the initial soil sample analysis for hexavalent chromium were below the QC limit of 75% for the spike recoveries associated with the twenty-eight (28) soil samples, the 28 soil samples of SDG JB53603 were reanalyzed for hexavalent chromium. The soil samples numbered JB53603-1R through -18R and JB53603-20R through -29R were re-analyzed and the data submitted in a supplemental data package labeled JB53603R (R for reanalysis). The samples were re-prepped on December 5 and reanalyzed December 8, 2013 for Cr⁺⁶, within the 30-holding time for soil samples. The samples present in SDG JB53603R are identified in Table 1, but are labeled with the suffix 'R' in the laboratory sample ID number such as JB53603-12R for the reanalysis of client ID sample ID011A 2-2.5, which was the sample used as one of the QC samples in SDG JB53603R. Hexavalent chromium was detected in 24 of the 28 soil samples reanalyzed with nine Cr+6 results above the SRS of 20 mg/Kg.

The case narrative of SDG JB53603R indicated that the QC requirements were met for the reanalysis of the soil samples of SDG JB53451R, except that the soluble MS recoveries were outside QC limits in both QC batches. However, the Cr+6 results associated with QC batch GP76469 were not subject to qualification despite the -18.7% spike recovery because the initial sample concentration was considerably more than the spike amount and the MS recoveries in another QC sample in this batch were within QC limits, as presented in Table 11 below.

Calibrations

The initial calibration for both QC batches in the analytical sequence of 12/8/13 demonstrated an acceptable correlation coefficient with the value of 0.99981, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 94.6% to 100.2% for the QC batches associated with the 28 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blank (< 0.40 mg/Kg), or any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike (MS) recovery for the soluble matrix spike was below QC limits in the re-analysis of JB53603-2R from soil sampling location KD004 6-6.5. Thus, the hexavalent chromium results for samples with laboratory sample ID numbers JB53603-1R through -5R, and JB53603-20R through -29R (inclusive) are still subject to qualification to be flagged with "NJ-".

Table 11. Matrix Spike Recovery Results in SDG JB53603R

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76468 ¥	JB53603-2R	Cr ⁺⁶ , soluble	59.3 %	NJ-	Low
GP76468 ¥	JB53603-2R	Cr ⁺⁶ , insoluble	81.5 %	----	----
GP76468 ¥	JB53603-2R	Cr ⁺⁶ , post spike	93.6%	----	----
GP76469 ¢	JB53603-7R	Cr ⁺⁶ , soluble	-18.7 %	****	****
GP76469 ¢	JB53603-7R	Cr ⁺⁶ , insoluble	106.6 %	----	----
GP76469 ¢	JB53603-7R	Cr ⁺⁶ , post spike	93.3 %	----	----
GP76469 ¢	JB53603-12R	Cr ⁺⁶ , soluble	79.2 %	----	----
GP76469 ¢	JB53603-12R	Cr ⁺⁶ , insoluble	93.1 %	----	----
GP76469 ¢	JB53603-12R	Cr ⁺⁶ , post spike	97.1%	----	----

QC Limits are 75-125% for MS Recovery; 85-115% for post spike recovery.
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 ¥ – The samples associated with QC Batch GP76468 consist of JB53603-1R through -5R, and JB53603-20R through -29R (inclusive);
 ¢ – The samples associated with QC Batch GP76469 consist of JB53603-6R through -18R (inclusive).
 **** – The sample concentration was > 4 × spike amount; associated sample results are not subject to qualification.

The NJDEP DV guidelines for Cr+6 specify 75-125% as the MS QC limits, with post-digestion spike recovery limits of 85-115%. Consequently, the associated hexavalent chromium results of the soil samples with ID number JB53603-1R through -5R and JB53603-20R through -29R (inclusive) were still subject to qualification following the DV review. The sample Cr+6 results associated with the elevated soluble MS recovery in JB53603-7R are not subject to qualification because the samples concentration (615 mg/Kg) was considerably more than four times the applied MS amount (42.7 mg/Kg) such that it was likely that the sample amount masked (dwarfed) the spike amount (NJDEP, 2005). The results of the analysis of another sample (JB53603-12R) exhibited acceptable MS recoveries, seemingly supporting the action of not qualifying the associated sample results.

These qualified Cr+6 results from the reanalysis are presented alongside those of the initial analysis in Table 12.

Duplicate Sample Analysis

Three soil samples were analyzed in duplicate with differences all less than 14%RPD, values less than the DV QC limit of 35%RPD, thereby demonstrating excellent analytical precision.

The difference between Cr+6 concentrations of field duplicate samples from JD002 4-4.5 was greater than two times the reporting limit (CRQL), a value above the QC limit (AECOM, 2010; USEPA, 2010). Consequently, both Cr+6 results for JB002 4-4.5 and DUP 20 are subject to qualification as estimated values and are flagged with “J” in Table 12 below.

Laboratory Control Sample (LCS) Analysis

The LCS recoveries were acceptable and within QC limits of 80-120%, with recoveries of ranging from 89.8% and 97.4%, thereby demonstrating acceptable analytical system performance.

Sample Result Verification

The detected hexavalent chromium concentration for Sample LD008A 5-5.5 (JB53603-7R) was listed as 615 mg/Kg on the reporting form and 0.2880 mg/L on the quantitation report in the raw data for a 50-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.2880 \text{ mg/L} \times 0.1 \text{ L} \times 50}{0.00249 \text{ Kg} \times 94.1/100} = \frac{1.4400}{0.0023431} = 614.5731 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 615 \text{ mg/Kg}$$

After rounding to 3 significant figures, this verifies that the hexavalent chromium concentration of 615 mg/Kg for Sample LD008A 5-5.5 was correctly reported.

SDG JB53603RT

The reducing conditions in the soil matrix appear supported by the TOC, S⁻ screen and Fe⁺² data. The associated QC results for the blank spike, duplicate analysis and the MS results were all within the specified QC limits demonstrating acceptable accuracy and precision.

The supporting analyses (ferrous iron, sulfide screen, and TOC) were analyzed on Sample JB53603-2RT (KD004 6-6.5), a sample which was analyzed twice without detecting a concentration of Cr+6 above 0.74 mg/Kg. The three supporting parameters were analyzed outside the respective holding times in order to provide more information about the possible impact of the sample matrix on the Cr+6 recoveries. Professional judgement was applied in not qualifying these results for the holding time exceedances. According to the method, these analyses should be performed on the sample experiencing the low spike recoveries; the soluble MS/MSD recoveries for this QC sample were 27.1% and 19.7%.

The detected ferrous iron (1.0%) and TOC concentration (84,000 mg/Kg) results in JB53603-2RT are at comparable levels with samples in the research literature identified as exhibiting “reducing” soil conditions (Brose and James, 2013; Jardine, et al., 1999), as also indicated on the Eh-pH phase diagram. Thus, the results of the supplemental analyses support the soil conditions being of a “reducing” environment. The “reducing” conditions in the soil matrix of a soil sample falling below the Eh-pH phase line are thereby supported by the TOC, Fe⁺² and Eh-pH data.

Summary for Hexavalent Chromium Analysis

The soil sample results from the initial analysis are presented alongside those obtained from the reanalysis of samples in SDG JB53603 below in Table 12. The Cr+6 results of the reanalysis appear to be comparable to those of the initial analysis, both associated with low MS recoveries and possibly suggesting a potential low bias in the ability to recover this analyte in the given sample matrix. Even the results of the duplicate analysis in the initial analysis of the QC sample associated with samples JB53603-6 through -18 (inclusive) which suggested possible variability in the analytical precision of samples in this batch did not appear to affect then results observed in the reanalysis.

Table 12. Comparison of Qualified Sample Cr⁺⁶ Results in SDGs JB53603 and JB53603R

Client ID	Lab Sample ID	Analyte	JB53603 Result (mg/Kg)	DV Qualifier	JB53603R Result (mg/Kg)	DV Qualifier
KD004 5-5.5	JB53603-1	Cr+6	11.8	NJ-	12.4	NJ-
KD004 6-6.5	JB53603-2	Cr+6	0.57	NJ-	0.74	NJ-
KD004 7-7.5	JB53603-3	Cr+6	< 0.45	NJ-	< 0.45	NJ-
KD004 8-8.5	JB53603-4	Cr+6	< 0.48	NJ-	1.3	NJ-
KD004 9-9.5	JB53603-5	Cr+6	< 0.44	NJ-	< 0.44	NJ-
LD008A 4-4.5	JB53603-6	Cr+6	9.8	*NJ-	8.1	
LD008A 5-5.5	JB53603-7	Cr+6	710	*NJ-	615	
LD008A 6-6.5	JB53603-8	Cr+6	7.2	*NJ-	10.6	
LD008A 7-7.5	JB53603-9	Cr+6	< 0.45	*NJ-	1.3	
LD008A 8-8.5	JB53603-10	Cr+6	0.78	*NJ-	3.0	
ID011A 0.5-1	JB53603-11	Cr+6	171	*NJ-	232	
LD011A 2-2.5	JB53603-12	Cr+6	92.6	*NJ-	50.9	
JD002 3-3.5	JB53603-13	Cr+6	< 0.45	*NJ-	< 0.45	
JD002 4-4.5	JB53603-14	Cr+6	< 0.44	*NJ-	0.77	J
JD002 5-5.5	JB53603-15	Cr+6	41.4	*NJ-	52.4	
JD002 6-6.5	JB53603-16	Cr+6	1.1	*NJ-	2.0	
JD002 7-7.5	JB53603-17	Cr+6	< 0.47	*NJ-	1.6	
DUP 20	JB53603-18	Cr+6	< 0.44	*NJ-	1.9	J
ID011A 4-4.5	JB53603-20	Cr+6	1.0	NJ-	1.4	NJ-
ID011A 6-6.5	JB53603-21	Cr+6	56.1	NJ-	20.9	NJ-
ID011A8-8.5	JB53603-22	Cr+6	6.9	NJ-	7.1	NJ-
JD003A 5-5.5	JB53603-23	Cr+6	659	NJ-	614	NJ-
JD003A 6-6.5	JB53603-24	Cr+6	131	NJ-	137	NJ-
JD003A 7-7.5	JB53603-25	Cr+6	6.1	NJ-	5.1	NJ-
JD003A 10-10.5	JB53603-26	Cr+6	1.8	NJ-	1.5	NJ-
JD003A 11-11.5	JB53603-27	Cr+6	< 0.51	NJ-	< 0.51	NJ-
LD001 2-2.5	JB53603-28	Cr+6	90.6	NJ-	73.6	NJ-
LD001 4-4.5	JB53603-29	Cr+6	36.7	NJ-	26.9	NJ-

< – The analyte was analyzed for, but not detected at the specified reporting limit.
J – The reported result is an estimated value;
NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; potential low bias;
*J – Duplicate analysis not within control limits; the value is estimated with indeterminate bias direction.

Review of Table 12 indicates that the Cr+6 results from both the initial and the re-analysis are remarkably comparable, even considering the potential for disparities attributable to soil sample non-homogeneity.

SDG JB53603T

One soil sample, LD001 4-4.5 (JB53603-29T), was re-analyzed for the five target metals. All QC requirements were met during the re-analysis of this sample, such as calibration, QC blanks, duplicate analysis, etc., except for the low MS/MSD recoveries for antimony in the QC sample.

The MS/MSD recoveries for antimony were below QC limits, as itemized in Table 13. Consequently, the antimony result in JB53603-29T was qualified as an estimated value and flagged with "NJ-" due to the potential low bias in the associated QC sample.

Table 13. Matrix Spike Recovery Results Outside QC Limits in JB53603T

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26737 Ж	FA11966-1	Antimony	39.8 %	39.1 %	NJ-	Low
QC Limits are 75-125%; NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike MSD – Matrix spike duplicate Ж – The sample associated with QC Batch MP26737 consists of JB53603-29T.						

The duplicate soil sample analysis was performed on a non-client QC sample where all results were below QC limits. The case narrative stated that the RPD for vanadium in the duplicate analysis was outside control limits. However, closer review of the data during the D V review indicated that the difference between the duplicate results was actually less than 2 × CRQL, thereby meeting QC limits for soil, such that the associated sample vanadium result was not subject to qualification.

The antimony and nickel result for Sample JB53603-29T exceeded the respective SRS criteria, with concentrations of 14.4 and 114 mg/Kg, respectively. The qualified antimony result is presented below in Table 14.

Table 14. Summary of Qualified Sample Metals Results in SDG JB53603 T

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
LD001 4-4.5	JB53603-29T	Antimony	14.4	NJ-
Key: NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.				

No other soil sample target metals results required any qualification for any associated QC issues.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

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- APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.
- Brose, D.A. and B.R. James, 2013, "Hexavalent Chromium Reduction by Tartaric Acid and Isopropyl Alcohol in Mid-Atlantic Soils and the Role of Mn(III, IV) (hydr)oxides", *Environmental Science & Technology*, Vol. 47, pages 12985-12991.
- Jardine, P.M., S.E. Fendorf, M.A. Mayes, I.L. Larsen, S.C. Brooks, and W.B. Bailey, 1999, "Fate and Transport of Hexavalent Chromium in Undisturbed Heterogeneous Soil", *Environmental Science & Technology*, Vol. 33 No. 17, pages 2939-2944.
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- New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.
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- US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13***, September 2006.
- US EPA, 1998, ***"Guidance for Data Quality Assessment, Practical Methods for Data Analysis"***, EPA QA/G-9 QA97 Version, Office of Research and Development, EPA/600/R-96/084, January 1998.
- US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.
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ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB53603/JB53603R/RT/T

1. Were the appropriate sample preservation requirements met?..... Yes No
 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
 If "No", provide a brief explanation.

3. Were the samples diluted? Yes No
 Indicate the identity of the samples and why.

Matrix interference for metal analysis at high Cr⁺⁶ concentrations above calibration range.
 (2x) JB53603-2, 3, 8, 15, 29. Cr⁺⁶: JB53603-7, 23 (50x)
 (4x) - 9, 22, 24, 26 JB53603-11, 12, 21, 24
 (5x) - 1, 4, 5, 6, 7, 10, 14, 16, 18, 21, 23, 28 | and 28 (5x).
 (10x) - 20

4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
 If "Yes", list the affected samples.

Antimony in JB53603-20
 Thallium in JB53603-20, 23

5. Were any applicable standards exceeded for any samples? Yes No
 If "Yes", include the number of samples and laboratory sample ID numbers.

Eight nickel: JB53603-3, 7, 17, 21, 23, 25, 28, 29.
 Four vanadium: JB53603-7, 21, 23, 28.
 One antimony: JB53603-21.
 Nine Cr⁺⁶: JB53603-7, 12, 15, 21, 23, 24, 28, 29, 11.

6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
 If "No", provide a brief explanation of action taken.

7. Were qualifications noted in the non-conformance summary?..... Yes No
 Provide a brief explanation.

*Refer to DV report discussions of case narrative regarding QC limit exceedances.
 No analytical/procedural problems were noted.*

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *NA*

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

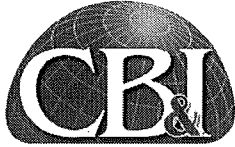
18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, 8, 9, 11 and 13 for details.

Qualified sample results are presented in Tables 7, 12 and 14 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB53706A
Sample Date: November 20, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: February 28, 2014

This data validation (DV) report presents the data review and result qualifications for fifteen (15) soil samples and one field blank (FB) collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 20, 2013 for sample delivery group (SDG) JB53706A. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53706A were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 15 collected soil samples and one FB.

Following the detailed DV review, the following sample results were qualified:

- Antimony (*NJ-) in Samples JB53706-9 through -18 (inclusive), and JB53706-20 through -24 (inclusive).
- Chromium (*EJ) in Samples JB53706-9 through -18 (inclusive), and JB53706-20 through -24 (inclusive).
- Nickel (*ENJ+) in Samples JB53706-9 through -18 (inclusive), and JB53706-20 through -24 (inclusive).
- Vanadium (*ENJ+) in Samples JB53706-9 through -18 (inclusive), and JB53706-20 through -24 (inclusive).

No other sample results in SDG JB53706A required qualification, including hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for antimony in seven soil samples and nickel in two soil samples. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were subject to qualification following the DV review are presented in Table 5 of this DV report.

Sample Receipt

The fifteen (15) soil samples collected November 20, 2013, were received November 20, 2013 at the Accutest laboratory in Dayton, NJ intact and chemically preserved with acceptable sampling cooler temperatures of 4.1°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. on November 22, 2013 in good condition with sampling cooler temperatures of 3°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ID005 4.5-5	JB53706-9	11/20/13	Soil	Metals, Cr+6
ID005 5.5-6	JB53706-10	11/20/13	Soil	Metals, Cr+6
ID005 6.5-7	JB53706-11	11/20/13	Soil	Metals, Cr+6
ID005 7.5-8	JB53706-12	11/20/13	Soil	Metals, Cr+6
ID005 8.5-9	JB53706-13	11/20/13	Soil	Metals, Cr+6
ID006 4-4.5	JB53706-14	11/20/13	Soil	Metals, Cr+6
ID006 5-5.5	JB53706-15	11/20/13	Soil	Metals, Cr+6
ID006 6-6.5	JB53706-16	11/20/13	Soil	Metals, Cr+6
ID006 7-7.5	JB53706-17	11/20/13	Soil	Metals, Cr+6
ID006 8-8.5	JB53706-18	11/20/13	Soil	Metals, Cr+6
FB 15	JB53706-19	11/20/13	Aqueous	Metals, Cr+6
ID007 4-4.5	JB53706-20	11/20/13	Soil	Metals, Cr+6
ID007 5-5.5	JB53706-21	11/20/13	Soil	Metals, Cr+6
ID007 6-6.5	JB53706-22	11/20/13	Soil	Metals, Cr+6
ID007 7-7.5	JB53706-23	11/20/13	Soil	Metals, Cr+6
ID007 8-8.5	JB53706-24	11/20/13	Soil	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast in Orlando, Florida.
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB53706A, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (✓) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| ✓ Holding times | Matrix spike recoveries |
| ✓ Blank Analysis | Duplicate analysis |
| ✓ Calibration standards | ✓ Laboratory control samples |
| ✓ Calibration verification | Serial dilution analysis |
| ✓ ICP Interference Check Sample | ✓ Quantitation checks |
| ✓ Data package completeness | ✓ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Soil sample results did not exhibit concentrations above the respective site remediation standard (SRS) levels in the 15 soil samples of this SDG, except for seven antimony and two nickel results.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony, nickel and vanadium were identified as being outside QC limits for a non-client sample in QC batch MP26456. The RPD for the duplicate analysis of a non-client QC sample for antimony, chromium, nickel and vanadium were outside QC limits in QC Batch MP26456 due to possible sample non-homogeneity. The case narrative identified the serial dilution results being outside QC limits in the QC batch for antimony, chromium, nickel and vanadium and stated that the percent differences were acceptable due to low initial sample concentrations. The case narrative also stated in conflicting statements that the serial dilution results were outside QC limits in the QC batch for chromium, nickel and vanadium and the differences were probably due to sample non-homogeneity. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There were, however, a few exceptions. The recovery of antimony in the closing CRI standard of analytical sequence MA11253 was 68%, a value marginally below the QC limit range of 70-130% (USEPA, 2010). The non-detect results of samples JB53706-12, -13, and -18 could be subject to qualification, but these results did not warrant qualification, because the reporting limits of the samples involved were above the "affected range" of approximately 0- 0.6 mg/Kg (true spike \pm CRQL) and also, there is no CRDL standard analysis requirement in Method 6010C (NJDEP, 2002). Additionally, the results for antimony in these samples are already qualified as estimated values for the low MS recoveries and results are flagged with "NJ-".

The antimony result in the field blank, FB 15, was subject to qualification because the CRI standard recovered only 64% in the closing standard associated with the sequence for the field blank analysis which was analyzed shortly prior to the CRI standard. The non-detect antimony result in the field blank was qualified as an estimated value due to low CRI standard recovery and because the non-detected result falls within the affected range of the CRI standard analysis.

There was one instance where the internal standard (IS#2) area count was above the identified QC limits in JB53706-12. Internal standard IS#2 is associated with chromium and vanadium. In the analytical sequence MA11253, the area count for IS #2 in JB53706-12 was identified as being outside QC limits on the QC summary report. However, based on control charts within the laboratory, the QC limits have been updated to 70-130%. Review of the data revealed that the area count for IS#2 (125%) was actually within the previous QC limits of 60-125%. Thus, this sample did not warrant reanalysis and the results for chromium and vanadium are considered acceptable for this sample. Consequently, the affected sample in MA11253, JB53706-12 was not reanalyzed, as the IS area counts is considered acceptable.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or the field blank, at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53706A.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis (QC Limits 75-125% Recovery; \leq 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony, nickel, and vanadium were outside QC limits of 75 - 125% for a PPG sample from another SDG which served as the QC sample in QC Batch MP26456 which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the sample results subject to qualification for spike recoveries outside QC limits were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential low bias or "J+" for a potential positive bias in the ability to recover the affected analyte in the given sample matrix,

in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26456 Ω	JB53603-12	Antimony	72.5 %	40.7 %	NJ-	Low
MP26456 Ω	JB53603-12	Nickel	520.1 %	124.7 %	NJ+	High
MP26456 Ω	JB53603-12	Vanadium	568.8 %	174.1 %	NJ+	High
QC Limits are 75-125%; NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. NJ+ – The matrix spike recovery was below QC limits; associated sample results may experience a potential high bias. MS – Matrix spike MSD – Matrix spike duplicate. Ω – The samples associated with QC Batch MP26456 consist of JB53706-9 through -18 (inclusive) and JB53706-20 through -24 (inclusive).						

Although the QC sample in this QC batch was a PPG sample from another SDG, the initial sample results for the analyzed analytes were similar to those concentration levels observed in PPG samples of this SDG. Consequently, it was judged appropriate to qualify the associated PPG soil sample results for this batch on the basis of the QC results. The antimony results in all of these affected samples are flagged with “NJ-” due to a potential low bias, while the nickel and vanadium results are qualified as estimated values and flagged with “NJ+” due to a potential positive (high) bias. These qualified results are presented below in summary table, Table 5, together with the results qualified for duplicate analysis and serial dilution analysis results.

The MS/MSD recoveries for chromium were considerably above QC limits, but the associated sample results were not qualified because the initial sample concentration was more than four times the spike value; sample results are not subject to qualification due to possible masking of the spike by the large initial sample concentration (USEPA, 2010; NJDEP, 2002).

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on a PPG sample from another SDG whose target analyte concentrations were not unlike those observed in the present PPG soil samples. The %RPD values were above the QC limit of 35%RPD for soil samples (USEPA, 2010) as depicted below in Table 3. A possible cause of the observed differences between the duplicate results may be attributable to sample non-homogeneity.

Table 3. Duplicate Analysis Results Outside QC Limits

QC Batch	QC Sample	Analyte	Spiked Duplicate Difference	DV Qualifier
MP26456 Ω	JB53603-12	Antimony	116.3 %RPD	*J
MP26456 Ω	JB53603-12	Chromium	109.9 %RPD	*J
MP26456 Ω	JB53603-12	Nickel	125.8 %RPD	*J
MP26456 Ω	JB53603-12	Vanadium	129.2%RPD	*J

QC Limit is 35%RPD;

* – Duplicate analysis not within control limits; indeterminate bias direction.

J – The reported result is an estimated value.

Ω – The samples associated with QC Batch MP26456 consist of JB53706-9 through -18 (inclusive) and JB53706-20 through -24 (inclusive).

Thus, the antimony, chromium, nickel and vanadium results associated with QC Batch MP26456 are qualified as estimated values and are to be flagged with “*J” due to the potential variability in the analytical precision, though without exhibiting any clear bias direction. When the “*J” qualifiers are combined with the qualifiers associated with the low antimony MS/MSD recoveries in the QC sample of this batch, the antimony results appear with “*NJ-” in the summary table, Table 5, while the chromium, nickel and vanadium results appear as “*EJ”, “*ENJ+”, and “*ENJ+”, respectively.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 101.0% - 109.2% for the soil sample metals analysis in QC Batch MP26456, and 95.5% to 106.0% for the batch containing the field blank (MP26446).

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative also stated that the RPDs for antimony, chromium, nickel, and vanadium are outside QC limits in QC Batch MP26456, but that the percent difference values were acceptable due to the low initial sample concentration (<50 times IDL). In situations where the initial sample concentration is less than 50 times the instrument detection limit (IDL), the serial dilution result does not meet the criterion for data validation qualification (USEPA, 2010). However, in the same case narrative, it was also stated in conflicting statements that the serial dilution results were outside QC limits in the QC batch for chromium, nickel and vanadium and the differences were probably due to sample non-homogeneity. A review of the data indicated that the first statement should pertain only to antimony, and that the serial dilution results were above the QC limit of 10%D for chromium, nickel, and vanadium, as summarized below in Table 4. Thus, these affected results in the samples associated with this elevated %D exceedance are subject to qualification following the DV review, as discussed below.

Table 4. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26456 Ω	JB53603-12	Chromium	28.9 %D	EJ
MP26456 Ω	JB53603-12	Nickel	29.0 %D	EJ
MP26456 Ω	JB53603-12	Vanadium	26.2 %D	EJ

Note –
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
Ω – The samples associated with QC Batch MP26456 consist of JB53706-9 through -18 (inclusive) and JB53706-20 through -24 (inclusive).

The associated chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB53706-9 through -18 (inclusive) and JB53706-20 through -24 (inclusive), are qualified as estimated values and flagged with “EJ” to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 5, along

with the results qualified for matrix spike recoveries and duplicate analysis results outside QC limits.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported antimony results:

$$\text{Antimony (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The antimony concentration for Sample ID005 4.5-5 (JB53706-9) was listed as 106 mg/Kg on the reporting form and 2.270 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Antimony (mg/Kg)} &= \frac{(2.270 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.21 \text{ g})(88.5/100\%)} = 105.9905 \mu\text{g/g} \\ &= 106 \text{ mg/Kg, dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the antimony concentration of 106 mg/Kg for Sample ID005 4.5-5 was correctly reported.

Reporting Limits

Six of the fifteen samples were diluted; however, all reporting limits were still below the respective SRS values.

Summary

The soil sample analytical results for the samples of SDG JB53706A were found to be compliant with the analytical methods for the analysis of metals in the fifteen (15) soil samples using SW-846 Method 6010C.

Several matrix spike recoveries in the QC sample were outside QC limits, such that the antimony results are qualified due to a potential low bias (NJ-), while the detected nickel and vanadium results are qualified as estimated values due to a potential positive (high) bias in the associated samples (flagged NJ+), as detailed in Table 5. Because there were differences between the duplicate analysis of the QC sample that were greater than the QC limit, the antimony, chromium, nickel and vanadium results are also qualified as estimated values and flagged with “*” in addition to either the “NJ” and/or “E” flags to indicate that there may be potential variability in the analytical precision in the reported results, as well, presumably due to possible sample non-homogeneity, but with no bias direction attributable to this potential variability.

The serial dilution results for chromium, nickel and vanadium in the QC sample of QC Batch MP26456 were above the QC limit of 10.0 %D, suggesting potential variability in the reported

results due to the presence of interference in the matrix, such that the identified chromium, nickel and vanadium sample results are qualified as estimated values and are flagged with "EJ" in 15 samples, as presented below in Table 5.

Table 5. Summary Qualified Sample Metals Results in SDG JB53706A

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ID005 4.5-5	JB53706-9	Antimony	106	*NJ-
ID005 4.5-5	JB53706-9	Chromium	15.3	*EJ
ID005 4.5-5	JB53706-9	Nickel	17.5	*ENJ+
ID005 4.5-5	JB53706-9	Vanadium	23.4	*ENJ+
ID005 5.5-6	JB53706-10	Antimony	41.3	*NJ-
ID005 5.5-6	JB53706-10	Chromium	13.9	*EJ
ID005 5.5-6	JB53706-10	Nickel	15.6	*ENJ+
ID005 5.5-6	JB53706-10	Vanadium	8.5	*ENJ+
ID005 6.5-7	JB53706-11	Antimony	< 2.1	*NJ-
ID005 6.5-7	JB53706-11	Chromium	20.7	*EJ
ID005 6.5-7	JB53706-11	Nickel	33.5	*ENJ+
ID005 6.5-7	JB53706-11	Vanadium	22.2	*ENJ+
ID005 7.5-8	JB53706-12	Antimony	< 0.90	*NJ-
ID005 7.5-8	JB53706-12	Chromium	11.6	*EJ
ID005 7.5-8	JB53706-12	Nickel	11.8	*ENJ+
ID005 7.5-8	JB53706-12	Vanadium	17.1	*ENJ+
ID005 8.5-9	JB53706-13	Antimony	< 0.90	*NJ-
ID005 8.5-9	JB53706-13	Chromium	14.7	*EJ
ID005 8.5-9	JB53706-13	Nickel	12.4	*ENJ+
ID005 8.5-9	JB53706-13	Vanadium	19.3	*ENJ+
ID006 4-4.5	JB53706-14	Antimony	15.6	*NJ-
ID006 4-4.5	JB53706-14	Chromium	18.8	*EJ
ID006 4-4.5	JB53706-14	Nickel	13.3	*ENJ+
ID006 4-4.5	JB53706-14	Vanadium	25.5	*ENJ+
ID006 5-5.5	JB53706-15	Antimony	3.9	*NJ-
ID006 5-5.5	JB53706-15	Chromium	11.7	*EJ
ID006 5-5.5	JB53706-15	Nickel	15.1	*ENJ+
ID006 5-5.5	JB53706-15	Vanadium	16.5	*ENJ+
ID006 6-6.5	JB53706-16	Antimony	14.5	*NJ-
ID006 6-6.5	JB53706-16	Chromium	140	*EJ
ID006 6-6.5	JB53706-16	Nickel	20.7	*ENJ+
ID006 6-6.5	JB53706-16	Vanadium	25.3	*ENJ+
ID006 7-7.5	JB53706-17	Antimony	< 2.0	*NJ-
ID006 7-7.5	JB53706-17	Chromium	13.2	*EJ
ID006 7-7.5	JB53706-17	Nickel	92.4	*ENJ+
ID006 7-7.5	JB53706-17	Vanadium	18.7	*ENJ+
ID006 8-8.5	JB53706-18	Antimony	< 1.1	*NJ-
ID006 8-8.5	JB53706-18	Chromium	11.9	*EJ
ID006 8-8.5	JB53706-18	Nickel	14.0	*ENJ+
ID006 8-8.5	JB53706-18	Vanadium	19.2	*ENJ+
FB 15	JB53706-19	Antimony	< 6.0 µg/L	J
ID007 4-4.5	JB53706-20	Antimony	< 2.1	*NJ-
ID007 4-4.5	JB53706-20	Chromium	12.8	*EJ
ID007 4-4.5	JB53706-20	Nickel	10.1	*ENJ+
ID007 4-4.5	JB53706-20	Vanadium	19.7	*ENJ+
ID007 5-5.5	JB53706-21	Antimony	< 4.8	*NJ-
ID007 5-5.5	JB53706-21	Chromium	17.5	*EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ID007 5-5.5	JB53706-21	Nickel	14.6	*ENJ+
ID007 5-5.5	JB53706-21	Vanadium	26.4	*ENJ+
ID007 6-6.5	JB53706-22	Antimony	24.2	*NJ-
ID007 6-6.5	JB53706-22	Chromium	9.9	*EJ
ID007 6-6.5	JB53706-22	Nickel	12.2	*ENJ+
ID007 6-6.5	JB53706-22	Vanadium	11.7	*ENJ+
ID007 7-7.5	JB53706-23	Antimony	32.0	*NJ-
ID007 7-7.5	JB53706-23	Chromium	9.9	*EJ
ID007 7-7.5	JB53706-23	Nickel	16.8	*ENJ+
ID007 7-7.5	JB53706-23	Vanadium	9.5	*ENJ+
ID007 8-8.5	JB53706-24	Antimony	43.4	*NJ-
ID007 8-8.5	JB53706-24	Chromium	8.9	*EJ
ID007 8-8.5	JB53706-24	Nickel	10.2	*ENJ+
ID007 8-8.5	JB53706-24	Vanadium	6.4	*ENJ+

Key:

- < – The analyte was analyzed for, but was not detected above the stated reporting limit.
- * – The duplicate analysis result in the associated QC sample is not within QC limits.
- J – The reported result is an estimated value.
- N – The matrix spike sample recovery in the associated QC sample is not within QC limits.
- J- – The result is an estimated value, but the result may be biased low.
- J+ – The result is an estimated value, but the result may be biased high.
- EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples and one for the field blank analysis.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ Quantitation checks | √ Data qualifiers |
| √ Data package completeness | |

Hexavalent chromium was detected in 10 of 15 soil samples analyzed in SDG JB53706A with detected concentrations of 12.1 or less, such that no Cr+6 results had exceeded the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.9999, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 93.0% to 97.0% for the QC batch associated with the 15 soil samples and 93.8% to 94.0% for the batch associated with the field blank, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L) or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 6. No hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 6. Hexavalent Chromium Analysis Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GN95380	JB53683-4	Cr ⁺⁶ , soluble	106.7 %	----	----
GP76344	JB53706-10	Cr ⁺⁶ , soluble	87.5 %	----	----
GP76344	JB53706-10	Cr ⁺⁶ , insoluble	94.7 %	----	----
GP76344	JB53706-10	Cr ⁺⁶ , post-spike	90.1 %	---	----

QC Limits are 75-125% for MS recovery; 85-115% for post-spike recovery
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium

Duplicate Sample Analysis

The 14.0%RPD result for the duplicate redox potential analysis was the highest result observed in the general chemistry set of duplicate analyses, a value within laboratory QC limits, as well as the 35%RPD project QC limit for soil samples (AECOM, 2010). All other duplicate analyses met QC requirements with values of 0.0 %RPD for Cr+6 in both matrices and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 88.0% to 100.0%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in either of the two analytical sequences. Serial dilution analysis is not a requirement of the analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ID006 6-6.5 (JB53706-16) was listed as 12.1 mg/Kg on the reporting form and 0.2681 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.2681 \text{ mg/L} \times 0.1 \text{ L} \times 1}{0.00244 \text{ Kg} \times 87.7/100} = \frac{0.02681}{0.0022204} = 12.0744 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 12.1 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 12.1 mg/Kg for Sample ID005 6-6.5 is correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 15 soil samples of this SDG, JB53706A. Thus, all detected Cr⁺⁶ concentration results were below the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

The pH and Eh results were compared to the Eh-pH phase diagrams and verified that the sample points are correctly located on the diagrams. All sample results were observed to fall under the Eh-pH phase diagram line, thereby demonstrating "reducing" conditions. Hexavalent chromium was detected in ten of the fifteen soil samples of JB53706A at concentrations of 12.1 mg/Kg or less, thus, were all below the SRS of 20 mg/Kg.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were within QC limits, as were all other QC results associated with the hexavalent chromium analysis, including the duplicate sample analysis, no Cr⁺⁶ results were qualified following the DV review.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16*, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

US EPA, CLP, 2010, *"National Functional Guidelines for Inorganic Superfund Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53706 A

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? *for metals analysis* Yes No

Indicate the identity of the samples and why. *Matrix interference*
(2x) JB 53706 - 11, 17, 20
(4x) JB 53706 - 9
(5x) JB 53706 - 14, 21

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Antimony in 7 samples : JB 53706 - 9, 10, 14, 16, 22, 23, 24
Nickel in 2 samples : JB 53706 - 11, 17

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

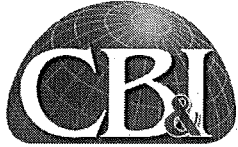
No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:
11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3 and 4 for details.

Minor issue regarding calibration issue is presented in DV report text.

Qualified sample results are presented in Table 5 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB53885
Sample Date: November 20 and 21, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga, Ph.D., REP5554
Report Date: February 19, 2014

This data validation (DV) report presents the data review and result qualifications for thirty-three (33) soil samples and one field blank (FB) collected at PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 20 and 21, 2013 for sample delivery group (SDG) JB53885. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey and Accutest Laboratories Southeast in Orlando, Florida.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53885 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr^{+6}) in the 33 collected soil samples and one FB.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53885-1 through -12 (inclusive), JB53885-25 through -33 (inclusive) and JB53885-35 through -46 (inclusive).
- Chromium (EJ) in Samples JB53885-31 through -33 (inclusive), and JB53885-35 through -46 (inclusive).
- Nickel (EJ) in Samples JB53885-1 through -12 (inclusive), JB53885-25 through -33 (inclusive) and JB53885-35 through -46 (inclusive).
- Vanadium (EJ) in Samples JB53885-1 through -12 (inclusive), JB53885-25 through -33 (inclusive) and JB53885-35 through -46 (inclusive).

No other sample results in SDG JB53885 required qualification, including hexavalent chromium results, based on the acceptable associated QC results and analytical performance. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for two nickel, two vanadium, and two hexavalent chromium results. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were subject to qualification following the DV review are presented in Table 6 and Table 9 of this DV report.

Sample Receipt

The thirty-three (33) soil samples and one field blank collected November 20 and 21, 2013, were received November 21, 2013 at the Accutest laboratory in Dayton, NJ intact and chemically preserved with acceptable sampling cooler temperatures of 3.4°C. The samples designated for metals analysis were received at the Accutest Laboratories Southeast, Inc. on November 23, 2013 properly preserved and intact with sampling cooler temperatures of 3.8°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ID001 5-5.5	JB53885-1	11/21/13	Soil	Metals, Cr+6
ID001 6-6.5	JB53885-2	11/21/13	Soil	Metals, Cr+6
ID001 7-7.5	JB53885-3	11/21/13	Soil	Metals, Cr+6
ID001 8-8.5	JB53885-4	11/21/13	Soil	Metals, Cr+6
DUP 22	JB53885-5	11/21/13	Soil	Metals, Cr+6
GI001 4-4.5	JB53885-6	11/21/13	Soil	Metals, Cr+6
GI001 5-5.5	JB53885-7	11/21/13	Soil	Metals, Cr+6
GI001 6-6.5	JB53885-8	11/21/13	Soil	Metals, Cr+6
GI001 7-7.5	JB53885-9	11/21/13	Soil	Metals, Cr+6
GI001 8-8.5	JB53885-10	11/21/13	Soil	Metals, Cr+6
KD002 3.5-4	JB53885-11	11/21/13	Soil	Metals, Cr+6
KD002 4.5-5	JB53885-12	11/21/13	Soil	Metals, Cr+6
KD002 5.5-6	JB53885-25	11/21/13	Soil	Metals, Cr+6
KD002 6.5-7	JB53885-26	11/21/13	Soil	Metals, Cr+6
KD002 7.5-8	JB53885-27	11/21/13	Soil	Metals, Cr+6
FDUP 23	JB53885-28	11/21/13	Soil	Metals, Cr+6
ID002 4.5-5	JB53885-29	11/21/13	Soil	Metals, Cr+6
ID002 5.5-6	JB53885-30	11/21/13	Soil	Metals, Cr+6
ID002 6.5-7	JB53885-31	11/21/13	Soil	Metals, Cr+6
ID002 7.5-8	JB53885-32	11/21/13	Soil	Metals, Cr+6
ID002 8.5-9	JB53885-33	11/21/13	Soil	Metals, Cr+6
FB16	JB53885-34	11/21/13	Aqueous	Metals, Cr+6
II008 4-4.5	JB53885-35	11/20/13	Soil	Metals, Cr+6
II008 5-5.5	JB53885-36	11/20/13	Soil	Metals, Cr+6
II008 6-6.5	JB53885-37	11/20/13	Soil	Metals, Cr+6
II008 7-7.5	JB53885-38	11/20/13	Soil	Metals, Cr+6
II008 8-8.5	JB53885-39	11/20/13	Soil	Metals, Cr+6
DUP 21	JB53885-40	11/20/13	Soil	Metals, Cr+6
KD001 4.5-5	JB53885-41	11/21/13	Soil	Metals, Cr+6
KD001 5.5-6	JB53885-42	11/21/13	Soil	Metals, Cr+6
KD001 6.5-7	JB53885-43	11/21/13	Soil	Metals, Cr+6
KD001 7.5-8	JB53885-44	11/21/13	Soil	Metals, Cr+6
KD001 8.5-9	JB53885-45	11/21/13	Soil	Metals, Cr+6
ID001 4-4.5	JB53885-46	11/21/13	Soil	Metals, Cr+6

Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C at Accutest Laboratories Southeast in Orlando, Florida.
 Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.

Data Review

Data, as presented in the analytical data package SDG JB53885, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) "*National Functional Guidelines for Inorganic Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005).

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Soil sample results did not exhibit concentrations above the respective site remediation standard (SRS) levels in the 33 soil samples of this SDG, except for two nickel and two vanadium results.

Laboratory Case Narrative

The case narrative identified that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were outside QC limits for samples ID001 5-5.5 and ID002 6.5-7 in QC

batches MP26457 and MP26466 due to possible matrix interference and/or sample non-homogeneity. The case narrative identified the serial dilution results being outside QC limits for nickel and vanadium in QC Batch MP26457 due to possible sample non-homogeneity. The case narrative also identified the serial dilution results (RPDs) as being outside QC limits in QC Batch MP26466 for chromium, nickel and vanadium and stated that the percent differences were acceptable due to low initial sample concentrations. However, inspection of the data revealed that the concentrations of all three of these analytes were actually above 50 × IDL and, therefore, outside QC limits in MP26466. All other QC requirements were met, including analyses for pH, oxidation reduction potential, and total solids. Details are discussed in the sections below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard) and high calibration standard (when analyzed), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination). There was, however, one exception.

The recovery of antimony in the closing CRI standard of analytical sequence MA11258 was 64%, a value marginally below the QC limit range of 70-130% (USEPA, 2010). The antimony result in the field blank, FB 16, was subject to qualification because the CRI standard recovered only 64% in the closing standard associated with the sequence for the field blank analysis. However, since the FB was analyzed much closer to the CRIA1 standard with an acceptable 116.0% recovery at the beginning of the sequence than the closing CRIA2 standard, it was judged appropriate to not qualify the antimony in FB16, since the initial CRDL standard is more likely representative of analytical conditions in the early portion of the sequence than the closing CRDL standard. In addition, there is no requirement for the analysis of a CRDL standard in USEPA Method 6010C and there is no guidance presented in the DV guidelines (NJDEP, 2002). Hence, the antimony result in FB 16 is not flagged in Table 6.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blanks, the continuing calibration blanks, or the field blank, at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53885.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis (QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for PPG samples JB53885-1 and -31 in both QC batches which are summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. Following the DV review, the sample results subject to qualification for spike recoveries outside QC limits were flagged with "N" to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a potential low bias in the ability to recover the affected analyte in the given

sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP26457 Ω	JB53885-1	Antimony	35.6 %	34.1 %	NJ-	Low
MP26466 £	JB53885-31	Antimony	22.8 %	22.6 %	NJ-	Low

QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate.
 Ω – The samples associated with QC Batch MP26457 consist of JB53885-1 through -12 (inclusive), JB53885-25 through -30 (inclusive).
 £ – The samples associated with QC Batch MP26466 consist of JB53885-31 through -33, (inclusive), and JB53885-35 through -46 (inclusive).

The antimony results in all of these affected samples are qualified as estimated values and flagged with “NJ-” due to a potential low bias. These qualified results are presented below in summary table, Table 6, together with the results qualified for the serial dilution analysis results, as well as the field duplicate sample analysis.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate analysis was performed on two pairs of PPG soil samples and one non-client aqueous sample. All %RPD values were below the QC limit of 35%RPD, with values ranging 0.0 to 11.1%RPD for soil samples, and 0-17.1%RPD for the aqueous fraction. Thus, no results required qualification. The duplicate analyses demonstrated excellent analytical precision for the soil sample analysis.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 97.1% - 112.4% for the soil sample metals analysis in the two QC batches, and 103.8% to 113.5% for the batch containing the field blank (MP26464).

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative identified the serial dilution results being outside QC limits for nickel and vanadium in QC Batch MP26457 due to possible sample non-homogeneity. The case narrative also identified the serial dilution results (RPDs) as being outside QC limits in QC Batch MP26466 for chromium, nickel and vanadium and stated that the percent differences were acceptable due to low initial sample concentrations (<50 times IDL). However, inspection of the data revealed that the concentrations of all three of these analytes were actually above 50 × IDL and, therefore, above the 10%D QC limit in MP26466 and, therefore, subject to qualification as summarized below in Table 3. Thus, these affected results in the samples associated with this elevated %D exceedance are subject to qualification following the DV review, as discussed below.

Table 3. Serial Dilution Results Above QC Limits

QC Batch	QC Sample	Analyte	% Difference	DV Qualifier
MP26457 Ω	JB53885-1	Nickel	14.4 %D	EJ
MP26457 Ω	JB53885-1	Vanadium	10.8 %D	EJ

MP26466 £	JB53885-31	Chromium	13.2 %D	EJ
MP26466 £	JB53885-31	Nickel	13.0 %D	EJ
MP26466 £	JB53885-31	Vanadium	13.0 %D	EJ
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.				
Note –				
Ω – The samples associated with QC Batch MP26457 consist of JB53885-1 through -12 (inclusive), JB53885-25 through -30 (inclusive).				
£ – The samples associated with QC Batch MP26466 consist of JB53885-31 through -33 (inclusive), and JB53885-35 through -46 (inclusive).				

The associated nickel and vanadium in samples with laboratory sample ID numbers ranging JB53885-1 through -12 (inclusive) and JB53885-25 through -30, inclusive, and chromium, nickel, and vanadium results in samples with laboratory sample ID numbers ranging JB53885-31 through -33 (inclusive) and JB53885-35 through -46, inclusive, are qualified as estimated values and flagged with "EJ" to indicate that the result is an estimated value possibly experiencing variability in the reported value due to the presence of an interference in the sample matrix. The individual qualified results are presented in the summary table, Table 6, along with the results qualified for matrix spike recoveries and field duplicate analysis results outside QC limits.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

Three sets of field duplicate samples were collected as part of SDG JB53885. Field duplicate sample collection and analysis can provide a determination of sampling representativeness and precision. Gross differences between field sample duplicates can be an indication of inconsistent sampling techniques or sample matrix complexities/non-homogeneity.

The advisory data validation guidelines for field duplicate soil sample analysis vary. There is no NJDEP DV guideline for qualifying field duplicate results (NJDEP, 2002). Recently, EPA has recommended qualifying field duplicate results that differ by more than 50%RPD or $> 2 \times \text{CRQL}$ (USEPA, 2010), while the Field Sampling Plan for Hudson County chromium sites lists a data quality objective (DQO) of 50%RPD for soil samples (AECOM, 2010).

The results for the analysis of the three pairs of field duplicate samples are presented in Table 4, below. It is apparent that the results for the metals analytes that were detected in the field duplicate samples were very similar in two of the three pairs of samples analyzed and, thus, are considered representative, as the concentrations between field duplicate samples differed by less than 11 %RPD or differed by less than two times the reporting limit value ($< 2 \times \text{CRQL}$) for all analyte pairs, except for all five analytes in the field duplicate samples from KD002 5.5-6. Soil sample non-homogeneity may have contributed to the observed disparities.

Table 4. Comparison of Field Duplicate Soil Sample Results – SDG JB53885

Analyte	ID001 5-5.5 (mg/Kg)	DUP 22 (mg/Kg)	% RPD	DV Flag
Antimony	< 4.8 NJ-	< 4.3 NJ-	< 2 × CRQL	-
Chromium	16.1	17.5	8.3 %	-
Nickel	11.6 EJ	16.9 EJ	37.2 %	-
Thallium	< 2.4	< 2.2	< 2 × CRQL	-
Vanadium	19.5 EJ	20.7 EJ	6.0 %	-
Analyte	KD002 5.5-6 (mg/Kg)	DUP 23 (mg/Kg)	% RPD	DV Flag
Antimony	4.0 NJ-	< 0.99 NJ-	> 2 × CRQL	(J)
Chromium	802	44.6	178.9 %	J
Nickel	53.3 EJ	11.1 EJ	131.1 %	(J)
Thallium	< 2.0	< 0.49	> 2 × CRQL	J

Vanadium	82.4 EJ	7.6 EJ	166.2 %	(J)
Analyte	I1008 6-6.5 (mg/Kg)	DUP 21 (mg/Kg)	% RPD	DV Flag
Antimony	< 5.5 NJ-	< 4.3 NJ-	< 2 × CRQL	-
Chromium	16.7 EJ	17.3 EJ	3.5 %	-
Nickel	15.8 EJ	14.2 EJ	10.7 %	-
Thallium	< 2.8	< 2.1	< 2 × CRQL	-
Vanadium	21.1 EJ	21.9 EJ	3.7 %	-

< – The analyte was not detected at the stated reporting limit;
J – The reported result is an estimated value;
NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low;
EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.
(J) – Sample result is subject to DV qualification, but not additionally flagged with “J” to avoid redundancy;
CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit;
< 2 × CRQL – The difference between field duplicate results was less than two times the CRQL and meets QC requirements.

Consequently, due to the disparity in the five respective metals analyte results for the field duplicate samples K002 5.5-6 and DUP 23, these results are subject to qualification and are to be flagged with “J”, as indicated in Table 4 above. However, the antimony, nickel and vanadium results from these two field duplicates of KD002 5.5-6 and DUP23 are already qualified and flagged with either “NJ-” or “EJ”. Consequently, these affected sample results were not further flagged with an additional “J” in an effort to avoid redundancy in the applied qualifiers. However, the chromium and thallium results in KD002 5.5-6 and DUP23 are subject to qualification for the disparity in field duplicate sample concentrations and are flagged with “J” in Table 4, as well as the summary table, Table 6, below. Otherwise, the field duplicate results for the field duplicate samples from I1008 6-6.5 and ID001 5-5.5 demonstrated very good sampling representativeness and precision, with results generally less than 11%RPD.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The vanadium concentration for Sample KD002 3.5-4 (JB53885-11) was listed as 206 mg/Kg on the reporting form and 3.667 mg/L on the quantitation report in the raw data. However, according to the laboratory, the dilution factor (DF) is incorporated into a conversion factor by the instrument, such that the “raw” concentration measurement is already corrected for the dilution. The DF need

not be applied to the equation such that the value for DF in the equation below is 1 and not the actual DF value of 4. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(3.667 \mu\text{g/L})(50 \text{ mL})(1)}{1000(\text{mL/L})(1.04 \text{ g})(85.6/100\%)} = 205.9557 \mu\text{g/g}$$

$$= 206 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 206 mg/Kg for Sample KD002 3.5-4 was correctly reported. This was the highest vanadium concentration detected among the soil samples of this SDG and exceeded the SRS of 78 mg/Kg.

Reporting Limits

The case narrative did identify that there were many analyte reporting limits that were elevated due to matrix interference. Review of the data indicated that there were a total of 25 of the 33 soil samples that had been diluted for analysis of metals at dilution factors of 5x, 4x, or 2x; however, all reporting limits were still below the respective SRS values, except for thallium in JB53885-33, as depicted below in Table 5.

The reporting limits for the target analytes determined for the ICP metals analysis employing the various assigned laboratory instruments all were below the respective site remediation standards; the exception was the instance where one sample was diluted by a factor of 5x, but the reporting limit was raised by a factor of 10, thereby raising the reporting limit for the thallium result above the respective SRS criterion, as detailed below in Table 5, diluted possibly due to anticipated matrix interference or sample/digestate appearance.

Table 5. Sample Reporting Limits Affected by Sample Dilution

Sample ID	Lab ID	Analyte	Reporting Limit (mg/Kg)	Dilution Factor	Adjusted Result	Remediation Standard
ID002 8.5-9	JB53885-33	Thallium	< 0.48	5	< 4.8	3
Units – mg/Kg < - The analyte was analyzed for, but was not detected above the stated reporting limit. NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.						

The results of the other analytes associated with the non-detect soil result of thallium in JB53885-33 were all below the respective SRS values, with low detected concentrations of nickel (11.3 mg/Kg) and vanadium (34.8 mg/Kg), including the low concentration of hexavalent chromium (3.4 mg/Kg), thereby suggesting a reasonably “clean” sample.

The interpretation of the thallium result (<4.8) in JB53885-33 was not significantly compromised by the applied dilution, because review of the data indicated the reason for the raising of the reporting limit was attributable to analyst judgement in including a safety factor (essentially doubling the 5x dilution to an effective value of 10x) to compensate for the presence of some interference in the sample data, rather than the presence of a detectable thallium concentration. Since the other target analytes in the sample were considerably below their respective SRS values, it is likely that the raw amount of thallium was similarly not elevated.

Summary

The soil sample analytical results for the samples of SDG JB53885 were found to be compliant with the analytical methods for the analysis of metals in the thirty-three soil samples and the field blank using SW-846 Method 6010C.

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony were outside QC limits of 75 - 125% for PPG samples JB53885-1 and -31 in the two QC batches. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity, such that antimony results in all soil samples of this SDG are qualified due to a potential low bias (NJ-).

Because there were differences between the field duplicate sample analyses that were greater than the respective QC limit, the chromium and thallium results in one set of field duplicate samples from KD002 5.5-6 are also qualified as estimated values and flagged with "J" in Table 6, presumably due to possible sample non-homogeneity or variability attributable to sample collection and or analytical precision.

The serial dilution results for nickel and vanadium in the QC sample of QC Batch MP26457 were above the QC limit of 10.0 %D, as were the chromium, nickel and vanadium results in MP26466, suggesting potential variability in the reported results due to the presence of interference in the matrix, such that the identified chromium, nickel and vanadium sample results are qualified as estimated values and are flagged with "EJ" in the samples identified below in Table 6.

Table 6. Summary of Qualified Sample Metals Results in SDG JB53885

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ID001 5-5.5	JB53885-1	Antimony	< 4.8	NJ-
ID001 5-5.5	JB53885-1	Nickel	11.6	EJ
ID001 5-5.5	JB53885-1	Vanadium	19.5	EJ
ID001 6-6.5	JB53885-2	Antimony	< 4.9	NJ-
ID001 6-6.5	JB53885-2	Nickel	13.4	EJ
ID001 6-6.5	JB53885-2	Vanadium	19.8	EJ
ID001 7-7.5	JB53885-3	Antimony	< 4.8	NJ-
ID001 7-7.5	JB53885-3	Nickel	14.1	EJ
ID001 7-7.5	JB53885-3	Vanadium	20.9	EJ
ID001 8-8.5	JB53885-4	Antimony	< 4.6	NJ-
ID001 8-8.5	JB53885-4	Nickel	14.3	EJ
ID001 8-8.5	JB53885-4	Vanadium	17.3	EJ
DUP 22	JB53885-5	Antimony	< 4.3	NJ-
DUP 22	JB53885-5	Nickel	16.9	EJ
DUP 22	JB53885-5	Vanadium	20.7	EJ
GI001 4-4.5	JB53885-6	Antimony	< 1.1	NJ-
GI001 4-4.5	JB53885-6	Nickel	10.0	EJ
GI001 4-4.5	JB53885-6	Vanadium	28.8	EJ
GI001 5-5.5	JB53885-7	Antimony	< 1.1	NJ-
GI001 5-5.5	JB53885-7	Nickel	10.1	EJ
GI001 5-5.5	JB53885-7	Vanadium	14.9	EJ
GI001 6-6.5	JB53885-8	Antimony	< 3.7	NJ-
GI001 6-6.5	JB53885-8	Nickel	13.4	EJ
GI001 6-6.5	JB53885-8	Vanadium	22.3	EJ
GI001 7-7.5	JB53885-9	Antimony	< 5.3	NJ-
GI001 7-7.5	JB53885-9	Nickel	15.2	EJ
GI001 7-7.5	JB53885-9	Vanadium	22.9	EJ

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
GI001 8-8.5	JB53885-10	Antimony	< 4.3	NJ-
GI001 8-8.5	JB53885-10	Nickel	15.5	EJ
GI001 8-8.5	JB53885-10	Vanadium	21.3	EJ
KD002 3.5-4	JB53885-11	Antimony	5.8	NJ-
KD002 3.5-4	JB53885-11	Nickel	115	EJ
KD002 3.5-4	JB53885-11	Vanadium	206	EJ
KD002 4.5-5	JB53885-12	Antimony	< 1.1	NJ-
KD002 4.5-5	JB53885-12	Nickel	8.3	EJ
KD002 4.5-5	JB53885-12	Vanadium	12.7	EJ
KD002 5.5-6	JB53885-25	Antimony	4.0	NJ-
KD002 5.5-6	JB53885-25	Chromium	802	J
KD002 5.5-6	JB53885-25	Nickel	53.3	EJ
KD002 5.5-6	JB53885-25	Thallium	< 2.0	J
KD002 5.5-6	JB53885-25	Vanadium	82.4	EJ
KD002 6.5-7	JB53885-26	Antimony	< 1.8	NJ-
KD002 6.5-7	JB53885-26	Nickel	9.5	EJ
KD002 6.5-7	JB53885-26	Vanadium	13.4	EJ
KD002 7.5-8	JB53885-27	Antimony	< 1.9	NJ-
KD002 7.5-8	JB53885-27	Nickel	9.0	EJ
KD002 7.5-8	JB53885-27	Vanadium	14.5	EJ
DUP 23	JB53885-28	Antimony	< 0.99	NJ-
DUP 23	JB53885-28	Chromium	44.6	J
DUP 23	JB53885-28	Nickel	11.1	EJ
DUP 23	JB53885-28	Thallium	< 0.49	J
DUP 23	JB53885-28	Vanadium	7.6	EJ
ID002 4.5-5	JB53885-29	Antimony	< 1.1	NJ-
ID002 4.5-5	JB53885-29	Nickel	12.5	EJ
ID002 4.5-5	JB53885-29	Vanadium	20.1	EJ
ID002 5.5-6	JB53885-30	Antimony	< 4.5	NJ-
ID002 5.5-6	JB53885-30	Nickel	13.12	EJ
ID002 5.5-6	JB53885-30	Vanadium	25.8	EJ
ID002 6.5-7	JB53885-31	Antimony	< 4.9	NJ-
ID002 6.5-7	JB53885-31	Chromium	17.3	EJ
ID002 6.5-7	JB53885-31	Nickel	14.3	EJ
ID002 6.5-7	JB53885-31	Vanadium	19.5	EJ
ID002 7.5-8	JB53885-32	Antimony	< 5.5	NJ-
ID002 7.5-8	JB53885-32	Chromium	16.3	EJ
ID002 7.5-8	JB53885-32	Nickel	12.9	EJ
ID002 7.5-8	JB53885-32	Vanadium	17.9	EJ
ID002 8.5-9	JB53885-33	Antimony	< 4.8	NJ-
ID002 8.5-9	JB53885-33	Chromium	34.4	EJ
ID002 8.5-9	JB53885-33	Nickel	11.3	EJ
ID002 8.5-9	JB53885-33	Vanadium	34.8	EJ
II008 4-4.5	JB53885-35	Antimony	< 5.0	NJ-
II008 4-4.5	JB53885-35	Chromium	118	EJ
II008 4-4.5	JB53885-35	Nickel	< 10	EJ
II008 4-4.5	JB53885-35	Vanadium	< 13	EJ
II008 5-5.5	JB53885-36	Antimony	< 3.9	NJ-
II008 5-5.5	JB53885-36	Chromium	18.9	EJ
II008 5-5.5	JB53885-36	Nickel	16.6	EJ
II008 5-5.5	JB53885-36	Vanadium	23.4	EJ
II008 6-6.5	JB53885-37	Antimony	< 5.5	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
II008 6-6.5	JB53885-37	Chromium	16.7	EJ
II008 6-6.5	JB53885-37	Nickel	15.8	EJ
II008 6-6.5	JB53885-37	Vanadium	21.1	EJ
II008 7-7.5	JB53885-38	Antimony	< 4.7	NJ-
II008 7-7.5	JB53885-38	Chromium	17.4	EJ
II008 7-7.5	JB53885-38	Nickel	17.4	EJ
II008 7-7.5	JB53885-38	Vanadium	24.6	EJ
II008 8-8.5	JB53885-39	Antimony	< 4.3	NJ-
II008 8-8.5	JB53885-39	Chromium	14.4	EJ
II008 8-8.5	JB53885-39	Nickel	17.7	EJ
II008 8-8.5	JB53885-39	Vanadium	19.0	EJ
DUP 21	JB53885-40	Antimony	< 4.3	NJ-
DUP 21	JB53885-40	Chromium	17.3	EJ
DUP 21	JB53885-40	Nickel	14.2	EJ
DUP 21	JB53885-40	Vanadium	21.9	EJ
KD001 4.5-5	JB53885-41	Antimony	< 1.0	NJ-
KD001 4.5-5	JB53885-41	Chromium	14.7	EJ
KD001 4.5-5	JB53885-41	Nickel	7.8	EJ
KD001 4.5-5	JB53885-41	Vanadium	10.7	EJ
KD001 5.5-6	JB53885-42	Antimony	< 0.98	NJ-
KD001 5.5-6	JB53885-42	Chromium	9.1	EJ
KD001 5.5-6	JB53885-42	Nickel	8.5	EJ
KD001 5.5-6	JB53885-42	Vanadium	6.1	EJ
KD001 6.5-7	JB53885-43	Antimony	< 0.99	NJ-
KD001 6.5-7	JB53885-43	Chromium	37.9	EJ
KD001 6.5-7	JB53885-43	Nickel	6.3	EJ
KD001 6.5-7	JB53885-43	Vanadium	14.0	EJ
KD001 7.5-8	JB53885-44	Antimony	< 4.9	NJ-
KD001 7.5-8	JB53885-44	Chromium	76.9	EJ
KD001 7.5-8	JB53885-44	Nickel	14.5	EJ
KD001 7.5-8	JB53885-44	Vanadium	22.1	EJ
KD001 8.5-9	JB53885-45	Antimony	< 3.8	NJ-
KD001 8.5-9	JB53885-45	Chromium	29.8	EJ
KD001 8.5-9	JB53885-45	Nickel	10.4	EJ
KD001 8.5-9	JB53885-45	Vanadium	23.8	EJ
ID001 4-4.5	JB53885-46	Antimony	< 5.3	NJ-
ID001 4-4.5	JB53885-46	Chromium	15.8	EJ
ID001 4-4.5	JB53885-46	Nickel	12.4	EJ
ID001 4-4.5	JB53885-46	Vanadium	34.7	EJ

Key:

- < –The analyte was analyzed for, but was not detected above the stated reporting limit.
- J – The reported result is an estimated value.
- NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
- EJ – The reported value is estimated because of the presence of interference; indeterminate bias direction.

No other soil sample target metals results required qualification for any associated QC issues following the DV review.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in two QC batches for the soil samples and one for the field blank analysis.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|---------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | Field duplicate sample analysis |
| √ Quantitation checks | √ Data qualifiers |
| √ Data package completeness | |

Hexavalent chromium was detected in 27 of 33 soil samples analyzed in SDG JB53885 with detected concentrations of 14.3 or less, except for the two results of 605 and 279 mg/Kg in samples JB53885-11 and -25, respectively, such that two Cr+6 results had exceeded the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that all QC requirements were met, including the holding time, method blanks, and matrix spike recoveries. Although the soluble spike recovery for sample KD002 3.5-4 was outside QC limits (236.6%), the results are not subject to qualification because the sample concentration was more than four times the spike value (NJDEP, 2005).

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values exceeding 0.99985, values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 93.7% to 101.3% for the QC batches associated with the 33 soil samples, and 95.6% to 96.0% for the batch associated with the field blank, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L) or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

All matrix spike recoveries were within the QC limits of 75-125%, as well as post spike recoveries that were within the 85-115% QC limits, as presented below in Table 7, except for the soluble spike recovery for sample KD002 3.5-4. Although the soluble spike recovery (236.6%) for sample KD002 3.5-4 was outside QC limits, no further action needs to be taken by the laboratory and the results are not subject to qualification, because the sample concentration was more than four times the spike value (NJDEP, 2005). Thus, no hexavalent chromium results required qualification based on the results of the MS recoveries in the two batches of soil samples and one batch associated with the field blank of this SDG.

Table 7. Hexavalent Chromium Analysis Matrix Spike Recovery Results (JB53885)

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GN95459 ©	JB53790-1	Cr ⁺⁶ , soluble	100.0 %	----	----
GP76359 ‡	JB53885-11	Cr ⁺⁶ , soluble	¥ 236.6 %	----	----
GP76359 ‡	JB53885-11	Cr ⁺⁶ , insoluble	87.8 %	----	----
GP76359 ‡	JB53885-11	Cr ⁺⁶ , post-spike	94.3 %	----	----
GP76360 №	JB53885-41	Cr ⁺⁶ , soluble	97.6 %	----	----
GP76360 №	JB53885-41	Cr ⁺⁶ , insoluble	92.8 %	----	----
GP76360 №	JB53885-41	Cr ⁺⁶ , post-spike	94.5 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post-spike recovery

MS – Matrix spike

Cr⁺⁶ – Hexavalent chromium

¥ – The sample concentration was > 4 × spike value; sample results not subject to qualification since spike may be masked.

© – The sample associated with QC Batch GN95459 consists of JB53885-34.

‡ – The samples associated with QC Batch GP76359 consist of JB53885-1 through -12 (inclusive), JB53885-35 through -40 (inclusive).

№ – The samples associated with QC Batch GP76360 consist of JB53885-25 through -33, (inclusive), and JB53885-41 through -46 (inclusive).

Duplicate Sample Analysis

The 19.9%RPD result for the duplicate Cr+6 analysis was the highest result observed in the general chemistry set of duplicate analyses, a value within laboratory QC limits, as well as the 35%RPD project QC limit for soil samples (AECOM, 2010). All other duplicate analyses met QC requirements with values of 0.0 %RPD for Cr+6 in the aqueous matrix and 2.9 to 19.9%RPD for the Cr+6, redox potential and pH analyses. Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries ranging 84.4% to 94.8%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in either of the two analytical sequences. Serial dilution analysis is not a requirement of the analytical method.

Field Duplicate Sample Analysis (QC Limit ≤ 50%RPD)

The results for the analysis of the three pairs of field duplicate samples are presented in Table 8, below.

Table 8. Comparison of Field Duplicate Soil Sample Results – SDG JB53885

Analyte	ID001 5-5.5 (mg/Kg)	DUP 22 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	0.48	1.1	< 2 × CRQL	-
Analyte	KD002 5.5-6 (mg/Kg)	DUP 23 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	279	< 0.45	> 2 × CRQL	J
Analyte	II008 6-6.5 (mg/Kg)	DUP 21 (mg/Kg)	% RPD	DV Flag
Hex.Chromium	< 0.45	5.7	> 2 × CRQL	J

QC Limit is ≤ 50 %RPD; < – The analyte was not detected at the stated reporting limit; J – The reported result is an estimated value; CRQL – The value representing the US EPA CLP contract required quantitation limit, often represented by the reporting limit; < $2 \times$ CRQL – The difference between field duplicate results was less than two times the reporting limit and meets QC requirements.

The results for the hexavalent chromium concentrations in the field duplicate samples from ID001 5-5.5 were similar and, thus, considered representative, as the concentrations between field duplicate samples differed by less than two times the reporting limit value ($< 2 \times$ CRQL). However, there appears to be great disparity between the field duplicate samples from KD002 5.5-6 and I1008 6-6.5 where the Cr+6 concentrations differed by more than twice the reporting limit ($> 2 \times$ CRQL) in these field duplicates.

As a result of the disparity in the respective hexavalent chromium results for the field duplicate samples from KD002 5.5-6 and I1008 6-6.5, these results are subject to qualification and are to be flagged with "J", as indicated in Table 8 above. Acceptable sampling representativeness and precision was demonstrated in one of the three pairs of field duplicate soil samples. The disparity between the remaining two sets of field duplicate samples may be attributable to soil sample non-homogeneity, failure to collect representative samples, or possible variability in the analytical precision which may act in concert to magnify the difference values. The qualified sample results for these field duplicate sample pairs are presented below in Table 9.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where:

- A = conc. from calib. curve (mg/L)
- B = Final digested volume (L)
- C = Wet wt of sample (Kg)
- D = % Solids/100
- E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample KD002 3.5-4 (JB53885-11) was listed as 605 mg/Kg on the reporting form and 0.2547 mg/L on the quantitation report in the raw data for a 50-fold diluted sample aliquot. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.2547 \text{ mg/L} \times 0.1 \text{ L} \times 50}{0.00246 \text{ Kg} \times 85.6/100} = \frac{1.2735}{0.0021058} = 604.7698 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 605 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 605 mg/Kg for Sample KD002 3.5-4 is correctly reported. This was the highest detected Cr⁺⁶ concentration detected among the 33 soil samples of this SDG, JB53885 and one of two Cr+6 concentration results above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No disparities relative to the reported values and characteristics were observed.

All but five of the 33 soil samples fell below the Eh/pH phase diagram line. These results suggest that almost all of the samples experience conditions of a “reducing” soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of these five samples experiencing oxidizing conditions, the highest detected Cr+6 concentrations were 605 mg/Kg in JB53885-11 and 279 mg/Kg in JB53885-25, while the remaining three samples presumed to be under “oxidizing” conditions were non-detect Cr+6 results. The corresponding total chromium results in the samples with Cr+6 concentrations above the SRS of 20 mg/Kg were 1240 and 802 mg/Kg, respectively. The remaining 28 soil samples of this SDG were under Eh/pH line denoting “reducing” conditions that are not favorable for oxidation to Cr+6 with concentrations of 14.3 mg/Kg or less.

Summary for Hexavalent Chromium Analysis

Since the MS recoveries were within QC limits, as were all other QC results associated with the hexavalent chromium analysis, including the duplicate sample analysis, no Cr⁺⁶ results were qualified following the DV review, except for select field duplicate results presented in Table 9.

Due to the differences between the Cr+6 results for the field duplicate samples from two locations being greater than the QC limit of > 2 × CRQL (or reporting limit), the affected Cr+6 results of both field duplicate pairs were qualified as estimated values and flagged with “J”, as presented in Table 9. No other Cr+6 results required qualification in SDG JB53885.

Table 9. Summary of Qualified Sample Cr⁺⁶ Results in SDG JB53885

Client ID	Laboratory Sample ID	Analyte	Result (mg/Kg)	DV Qualifier
KD002 5.5-6	JB53885-25	Cr+6	279	J
DUP 23	JB53885-28	Cr+6	< 0.45	J
II008 6-6.5	JB53885-37	Cr+6	< 0.45	J
DUP 21	JB53885-40	Cr+6	5.7	J
< – The analyte was analyzed for, but not detected at the specified reporting limit. J – The reported result is an estimated value.				

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
<	The compound was analyzed, but was not detected at the stated reporting limit.
J	The reported result is an estimated value.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, *Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, dated June 2010.

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16*, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001; *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

US EPA, CLP, 2010, "*National Functional Guidelines for Inorganic Superfund Data Review*", OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53885

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why. *Matrix interference.*

(5x) JB 53885- 1, 2, 3, 4, 5, 9, 30, 31, 32, 33, 35, 37, 38, 44, 46.
 (4x) JB 53885- 8, 10, 11, 25, 36, 39, 40, 45.
 (2x) JB 53885- 26, 27.

Hex chrome = JB 53885- 11 (50x); -25 (25x)

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

Thallium in JB 53885- 33

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

*Two nickel results : 53885- 11, 25
 Two vanadium results : 53885- 11, 25
 Two Cr⁶⁺ results : 53885- 11, 25*

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

*Refer to DV report discussions of case narrative regarding QC limit exceedances.
 No analytical problems with procedures were noted.*

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*

10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:

- 11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
- 12. Were the QC Summary Forms reviewed?..... Yes No
- 13. Internal Standards acceptable..... Yes No
- 14. MS/MSD acceptable..... Yes No
- 15. Calibration summaries acceptable..... Yes No
- 16. Serial dilutions acceptable..... Yes No
- 17. Inorganic duplicates acceptable..... Yes No
- 18. LCS recovery acceptable..... Yes No
- 19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 3, 4, and 8 for details.

Qualified sample results are presented in tables 6 and 9 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB53979/JB53979R
Sample Date: November 22, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: J. Giga. Ph.D., REP5554
Report Date: February 21, 2014

This data validation (DV) report presents the data review and result qualifications for seventeen (17) soil samples and one (1) field blank (FB) collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 22, 2013 for sample delivery group (SDG) JB53979. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB53979 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 17 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony (NJ-) in Samples JB53979-1 through -17 (inclusive);
- Hexavalent chromium (NJ-) in Samples JB53979-1 through -17 (inclusive);
- Hexavalent chromium (NJ-) in reanalyzed Samples JB53979-1R through -17R (inclusive)

No other sample results in SDG JB53979 required qualification. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for seven nickel, two vanadium and six hexavalent chromium (Cr+6) results. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were subject to qualification following the DV review are presented in Tables 3 and 6 of this DV report.

Sample Receipt

The seventeen (17) soil samples and one (1) field blank collected November 22, 2013 were received at the Accutest laboratory the same day on November 22, 2013 with acceptable sampling

cooler temperatures of 4°C. The field sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
JD004B 3-3.5	JB53979-1	11/22/13	Soil	Metals, Cr+6
JD004B 4-4.5	JB53979-2	11/22/13	Soil	Metals, Cr+6
KD005A 5-5.5	JB53979-3	11/22/13	Soil	Metals, Cr+6
KD005A 6-6.5	JB53979-4	11/22/13	Soil	Metals, Cr+6
KD005A 7-7.5	JB53979-5	11/22/13	Soil	Metals, Cr+6
KD005A 8-8.5	JB53979-6	11/22/13	Soil	Metals, Cr+6
KD005A 9-9.5	JB53979-7	11/22/13	Soil	Metals, Cr+6
II009 0.5-1	JB53979-8	11/22/13	Soil	Metals, Cr+6
II009 2-2.5	JB53979-9	11/22/13	Soil	Metals, Cr+6
II009 4-4.5	JB53979-10	11/22/13	Soil	Metals, Cr+6
II009 6-6.5	JB53979-11	11/22/13	Soil	Metals, Cr+6
II009 8-8.5	JB53979-12	11/22/13	Soil	Metals, Cr+6
LD001A 2-2.5	JB53979-13	11/22/13	Soil	Metals, Cr+6
LD001A 3-3.5	JB53979-14	11/22/13	Soil	Metals, Cr+6
LD001A 4-4.5	JB53979-15	11/22/13	Soil	Metals, Cr+6
LD001A 5-5.5	JB53979-16	11/22/13	Soil	Metals, Cr+6
LD001A 6-6.5	JB53979-17	11/22/13	Soil	Metals, Cr+6
FB 17	JB53979-18	11/22/13	Aqueous	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C.				
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB53979, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables

package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Several sample results exhibited concentrations above the respective site remediation standard (SRS) in some of the 17 soil samples of this SDG. These include seven nickel and two vanadium results that exceeded the SRS criteria of 31 mg/Kg and 78 mg/Kg, respectively.

Laboratory Case Narrative

The case narrative stated that the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for antimony were identified as being outside QC limits in QC Batch MP76350 indicating possible matrix interference and/or sample non-homogeneity. The case narrative stated that the RPD for thallium in the serial dilution analysis was outside control limits, but the percent difference was acceptable due to low initial sample concentration (< 50 times IDL).

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

The QC calibration requirements were mostly met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for a few minor excursions.

The exceptions included the internal standard area count for IS#2 which is associated with chromium and vanadium in analytical run MA32772 for sample JB539789-7. However, this sample was reanalyzed with acceptable IS area counts. In this same analytical sequence, the 2 µg/L low-level calibration (CRI) standard for thallium recovered 150%, 0% and 170%, values outside the QC limits of 70-130%. However, the reporting limits for the non-detected thallium results in the

associated samples were generally approximately 1.0 mg/Kg, values above the corresponding "affected range" of 0-0.5 mg/Kg (true spike ± CRQL) and, therefore, not subject to qualification. Furthermore, the analysis of a low-level (CRI) standard is not a requirement of Method 6010C and, consequently, no DV procedure for qualifying this data. Additionally, the 160% thallium recovery for the CRID4 standard in MA32786 also did not affect the associated sample JB539789-7 because the non-detect result does not manifest a positive bias and therefore, also would not be subject to qualification.

Thallium was detected in a few CCBs of sequence MA32782 which was associated with only the field blank. The elevated CRI recoveries for thallium or antimony in this sequence also did not affect the field blank results because the non-detect results of the field blank are not affected by any potential positive bias suggested by the CRI standard or the associated CCB contamination.

Consequently, even though there were some minor issues with calibrations in this SDG, no associated sample results were affected or subject to qualification.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53979.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony in a non-client QC sample in QC Batch MP76350 for soil samples were below QC limits of 75-125% associated with all 17 soil samples, as summarized in Table 2 below. These recoveries indicate possible matrix interference and/or possible sample non-homogeneity. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP76530 Ω	JB53994-1A	Antimony	34.0 %	35.7 %	NJ-	Low
QC Limits are 75-125%; Post-digestion spike QC is 80-120% NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias. MS – Matrix spike MSD – Matrix spike duplicate Ω – The samples associated with QC Batch MP76350 consist of JB53979-1 through -17 (inclusive).						

Since none of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits, the sample results subject to qualification for low spike recoveries were flagged with "N" following the DV review to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a possible low bias in the ability to recovery

the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). These qualified results are presented below in summary table, Table 3.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate soil sample analysis was performed on one spiked duplicate sample from a non-client sample as a means of assessing the analytical precision. The concentrations for the target analytes were not unlike those frequently observed in PPG samples. The %RPD values ranged from 0.8 to 13.7 %RPD, values all well below the QC limit of 35%RPD for soil samples and the associated results did not require qualification. The duplicate and spike duplicate results in the QC batch associated with the field blank were also within the 20%RPD QC limits for aqueous samples. The duplicate analyses demonstrated excellent analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 86.4% - 101.8%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative stated that the RPD for thallium in the serial dilution analysis was outside control limits, but the percent difference was acceptable due to low initial sample concentration (< 50 times IDL). All other results for the serial dilution analysis were within QC limits, thus, no sample results were qualified for any serial dilution issues.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported metals results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading (µg/L)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The vanadium concentration for Sample JD004B 3-3.5 (JB53979-1) was listed as 250 mg/Kg on the reporting form and 2.342 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Vanadium (mg/Kg)} &= \frac{(2.342 \mu\text{g/L})(100 \text{ mL})(1)}{1000(\text{mL/L})(1.03 \text{ g})(91.1\%/100\%)} = 249.5924 \mu\text{g/g} \\ &= 250 \text{ mg/Kg dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 250 mg/Kg for Sample JD004B 3-3.5 was correctly reported. This value is above the SRS of 78 mg/Kg. Vanadium was detected in one other sample above the SRS criterion.

Reporting Limits

No samples destined for metals analysis required dilution at the Accutest laboratory in Dayton, NJ, such that all reporting limits were below the respective SRS values.

Summary

The soil sample analytical results for the samples of SDG JB53979 were found to be compliant with the analytical methods for the analysis of metals in the seventeen soil samples using SW-846 Method 6010C.

The QC criteria were met for all ICP target analyte analyses, except for the low MS/MSD recoveries for antimony in the QC sample of QC Batch MP76350 which employed a non-client soil sample for the QC analysis. Sample results were qualified based on the results of the non-client QC samples because the sample concentrations were not unlike those observed in PPG soil samples. The soil samples collected November 22, 2013 are qualified as estimated values for antimony (flagged "NJ-") in the associated 17 soil samples due to a potential low bias, as indicated below in Table 3.

Table 3. Summary of Qualified Sample Metals Results in SDG JB53979

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
JD004B 3-3.5	JB53979-1	Antimony	< 2.1	NJ-
JD004B 4-4.5	JB53979-2	Antimony	< 2.1	NJ-
KD005A 5-5.5	JB53979-3	Antimony	< 2.4	NJ-
KD005A 6-6.5	JB53979-4	Antimony	< 2.5	NJ-
KD005A 7-7.5	JB53979-5	Antimony	< 2.2	NJ-
KD005A 8-8.5	JB53979-6	Antimony	< 2.3	NJ-
KD005A 9-9.5	JB53979-7	Antimony	< 2.3	NJ-
II009 0.5-1	JB53979-8	Antimony	< 2.3	NJ-
II009 2-2.5	JB53979-9	Antimony	< 2.3	NJ-
II009 4-4.5	JB53979-10	Antimony	< 2.2	NJ-
II009 6-6.5	JB53979-11	Antimony	< 2.2	NJ-
II009 8-8.5	JB53979-12	Antimony	< 2.4	NJ-
LD001A 2-2.5	JB53979-13	Antimony	< 2.1	NJ-
LD001A 3-3.5	JB53979-14	Antimony	< 2.2	NJ-
LD001A 4-4.5	JB53979-15	Antimony	< 2.4	NJ-
LD001A 5-5.5	JB53979-16	Antimony	< 2.4	NJ-
LD001A 6-6.5	JB53979-17	Antimony	< 2.0	NJ-

Key:
< –The analyte was analyzed for, but was not detected above the stated reporting limit.
NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples and one QC batch for the single field blank.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in twelve of the seventeen soil samples, with six concentrations exceeding the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that the QC requirements were met, including the holding time, method blanks, and matrix spike recoveries, except for the low soluble MS recovery in QC Batch GP76397, indicating possible matrix interference. The soluble MS recovery in QC Batch GP76397 was outside QC limits, but the insoluble spike and post-spike recoveries were acceptable.

Calibrations

The initial calibrations demonstrated an acceptable correlation coefficient with values all exceeding 0.99985 values greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 101.8% to 102.4% for the QC batch associated with the 17 soil samples, and were 100.1% for the QC batch associated with the field blank sample, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L), or the field blank. Thus, no sample results are affected or qualified for any potential QC blank contamination. Hexavalent chromium was not detected in the field blank at a reporting limit of 0.010 mg/L.

Matrix Spike Analysis

The matrix spike recoveries were within the QC limits of 75-125%, except for the soluble MS recovery for JB53979-7 in QC Batch GP76397. The low soluble matrix spike recovery for hexavalent chromium below the QC limits of 75-125% indicate possible matrix interference. The other matrix spike recoveries that were within the respective QC limits, are also presented in the summary table, Table 4.

Table 4. Matrix Spike Recovery Results

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76397 ¥	JB53979-7	Cr ⁺⁶ , soluble	54.5 %	NJ-	Low
GP76397 ¥	JB53979-7	Cr ⁺⁶ , insoluble	99.7 %	----	----
GP76397 ¥	JB53979-7	Cr ⁺⁶ , post spike	85.1 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 ¥ – The samples associated with QC Batch GP76397 consist of JB53979-1 through -17 (inclusive).

The soluble MS recovery of 54.5% was below QC limits for Cr⁺⁶ for the spiked sample from sampling location KD005A 9-9.5 in the soil sample analysis in QC Batch GP76397 which was associated with 17 soil samples with lab sample IDs of JB53979-1 through -17 (inclusive). In consideration of the DV guidelines that are based on SW-846 Method 7196A (NJDEP, 2005), the hexavalent chromium results for the associated seventeen soil samples are, consequently, qualified as estimated values and flagged with "NJ-" due to the potential low bias in the ability to recover this analyte in the soil matrix. These qualified results are presented below in Table 6.

Duplicate Sample Analysis

The duplicate analysis was performed on PPG sample JB53979-7. All %RPD values were below the QC limit of 35%RPD for soil samples, as well as the 20%RPD QC limit for aqueous samples and no results required qualification. The duplicate analyses had all RPD values below 4.4 %RPD, thereby demonstrating excellent analytical precision for the Cr+6, pH and redox potential analyses.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries between 100.5% and 101.1% for the soil sample analyses, and 100.0% for the analysis associated with the field blank, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches. This is not a required analysis of the analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

- Where:
- A = conc. from calibration curve (mg/L)
 - B = Final digested volume (L)
 - C = Wet wt of sample (Kg)
 - D = % Solids/100
 - E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample LD001A 2-2.5 (JB53979-13) was listed as 104 mg/Kg on the reporting form and 0.4866 mg/L on the quantitation report in the raw data for a 5-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.4866 \text{ mg/L} \times 0.1 \text{ L} \times 5}{0.00252 \text{ Kg} \times 92.8/100} = \frac{0.2433}{0.0023386} = 104.0384 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 104 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 104 mg/Kg for Sample LD001A 2-2.5 was correctly reported. This was the highest detected Cr+6 concentration detected among the 17 soil samples of this SDG, JB53979 analyzed for hexavalent chromium. This was one of six detected Cr+6 concentrations result above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

Six of the 17 soil samples were above the Eh/pH phase diagram line. These results suggest that most of the samples experience conditions of a "reducing" soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of the six samples experiencing "oxidizing" conditions, the highest detected Cr+6 concentration was 104 mg/Kg in JB53979-13; the total chromium result from its ICP analysis was 345 mg/Kg. Of the five remaining sample Cr+6 results above the Eh-pH line, three exhibited a Cr+6 result above the SRS with corresponding total chromium values ranging from 345 to 2030 mg/Kg Cr. Two of these samples above the Eh/pH line had Cr+6 concentrations less than 12 mg/Kg and total chromium values of less than 19 mg/Kg. Consequently, the positioning of a sample above the Eh/pH line does not always stipulate that an excess of Cr+6 will be present in a sample.

Summary of Cr+6 Results in SDG JB53979

Due to the low MS recovery for the soluble spike in QC Batch GP76397, the Cr⁺⁶ results in the associated 17 soil samples are qualified as estimated values and flagged with "NJ-" due to a potential low bias in the ability to recover Cr+6 from the given soil matrix. No other Cr+6 results were subject to qualification in the hexavalent chromium analyses, or the pH, redox potential or total solids analyses. The Cr+6 results qualified due to low Cr⁺⁶ spike recoveries in the soluble MS analysis following the DV review are presented in Table 6 near the end of this DV report in a comparison to results from their reanalysis.

Because the soluble MS recovery values were below QC limits in QC batch GP76397, the samples required reanalysis where the resultant data are presented in SDG JB53979R and summarized in this report in sections below under the subsection labeled "SDG JB53979R".

SDG JB53979R

Because the soluble MS recovery in the initial soil sample analysis for hexavalent chromium was below the QC limit of 75% for the spike recovery associated with the 17 soil samples, the 17 soil samples of SDG JB53979 were reanalyzed for hexavalent chromium. The soil samples numbered JB53979-1R through -17R were re-analyzed and the data submitted in a supplemental data package labeled JB53979R (R for reanalysis). The samples were re-prepped and analyzed on December 6, 2013 for Cr⁺⁶, within the 30-holding time for soil samples. The samples present in SDG JB53979R are identified in Table 1, but are labeled with the suffix 'R' in the laboratory sample ID number such as JB53979-7R for the reanalysis of client ID sample KD005A 9-9.5, which was

the sample used as the QC sample in SDG JB53979R. Hexavalent chromium was detected in 13 of the 17 soil samples reanalyzed with five Cr+6 results above the SRS of 20 mg/Kg.

The case narrative of SDG JB53979R indicated that the QC requirements were met for the reanalysis of the soil samples of SDG JB53979R, except that the soluble MS recovery was outside QC limits in the QC batch, as presented in Table 5 below.

Calibrations

The initial calibration for the QC batches in the analytical sequence of 12/5/13 demonstrated an acceptable correlation coefficient with the value of 0.99984, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 95.0% to 96.6% for the QC batch associated with the 17 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blank (< 0.40 mg/Kg), or any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike (MS) recovery for the soluble matrix spike was below QC limits in the re-analysis of JB53979-7R from soil sampling location KD005A 9-9.5, as noted in Table 5. Thus, the hexavalent chromium results for samples with laboratory sample ID numbers JB53979-1R through -17R (inclusive) are still subject to qualification to be flagged with "NJ-".

Table 5. Matrix Spike Recovery Results in SDG JB53979R

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76499 ϕ	JB53979-7R	Cr ⁺⁶ , soluble	6.7 %	NJ-	Low
GP76499 ϕ	JB53979-7R	Cr ⁺⁶ , insoluble	90.7 %	----	----
GP76499 ϕ	JB53979-7R	Cr ⁺⁶ , post spike	85 %	----	----

QC Limits are 75-125% for MS Recovery; 85-115% for post spike recovery.
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 ϕ – The samples associated with QC Batch GP76499 consist of JB53979-1R through -17R (inclusive).

The soluble MS recovery of 6.7% was below QC limits for Cr⁺⁶ for the spiked sample from sampling location KD005A 9-9.5 in the soil sample analysis in QC Batch GP76499 which was associated with 17 soil samples with lab sample IDs of JB53979-1R through -17R (inclusive). Despite the 6.7% soluble MS recovery, the results were not rejected, but qualified as estimated values flagged with "NJ-", because the insoluble MS recovery was within QC limits, an approach found acceptable by Mr. Joseph Sanguiliano of the NJDEP.

These qualified Cr+6 results from the reanalysis are presented alongside those of the initial analysis in Table 6. The comparison indicates that the results from the re-analysis are remarkably comparable to those of the initial analysis.

Duplicate Sample Analysis

One soil sample was analyzed in duplicate with a difference of 15.9%RPD, a value less than the DV QC limit of 35%RPD, thereby demonstrating excellent analytical precision.

Laboratory Control Sample (LCS) Analysis

The LCS recoveries were acceptable and within QC limits of 80-120%, with recoveries of ranging from 90.0% and 92.4%, thereby demonstrating acceptable analytical system performance.

Sample Result Verification

The detected hexavalent chromium concentration for Sample LD001A 2-2.5 (JB53979-13R) was listed as 102 mg/Kg on the reporting form and 0.4775 mg/L on the quantitation report in the raw data for a 5-fold dilution analysis. A calculation check provides the following result:

$$Cr^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$Cr^{+6} \text{ (mg/Kg)} = \frac{0.4775 \text{ mg/L} \times 0.1 \text{ L} \times 5}{0.00253 \text{ Kg} \times 92.8/100} = \frac{0.23875}{0.0023478} = 101.6892 \text{ mg/Kg}$$

$$Cr^{+6} \text{ (mg/Kg)} = 102 \text{ mg/Kg}$$

After rounding to 3 significant figures, this verifies that the hexavalent chromium concentration of 102 mg/Kg for Sample LD001A 2-2.5 was correctly reported.

Summary for Hexavalent Chromium Analysis

The soil sample results from the initial analysis are presented alongside those obtained from the reanalysis of samples in SDG JB53979 below in Table 6. The Cr+6 results of the reanalysis appear to be comparable to those of the initial analysis, both associated with low MS recoveries and possibly suggesting a potential low bias in the ability to recover this analyte in the given sample matrix.

Table 6. Comparison of Qualified Sample Cr⁺⁶ Results in SDGs JB53979 and JB53979R

Client ID	Lab Sample ID	Analyte	JB53979 Result (mg/Kg)	DV Qualifier	JB53979R Result (mg/Kg)	DV Qualifier
JD004B 3-3.5	JB53979-1	Cr+6	82.7	NJ-	69.6	NJ-
JD004B 4-4.5	JB53979-2	Cr+6	3.7	NJ-	4.1	NJ-
KD005A 5-5.5	JB53979-3	Cr+6	28.5	NJ-	26.6	NJ-
KD005A 6-6.5	JB53979-4	Cr+6	10.0	NJ-	11.0	NJ-
KD005A 7-7.5	JB53979-5	Cr+6	< 0.45	NJ-	0.59	NJ-
KD005A 8-8.5	JB53979-6	Cr+6	< 0.46	NJ-	< 0.46	NJ-
KD005A 9-9.5	JB53979-7	Cr+6	0.90	NJ-	0.81	NJ-
II009 0.5-1	JB53979-8	Cr+6	6.1	NJ-	7.2	NJ-
II009 2-2.5	JB53979-9	Cr+6	0.76	NJ-	1.2	NJ-
II009 4-4.5	JB53979-10	Cr+6	24.4	NJ-	27.2	NJ-
II009 6-6.5	JB53979-11	Cr+6	< 0.46	NJ-	< 0.46	NJ-
II009 8-8.5	JB53979-12	Cr+6	< 0.46	NJ-	< 0.46	NJ-
LD001A 2-2.5	JB53979-13	Cr+6	104	NJ-	102	NJ-
LD001A 3-3.5	JB53979-14	Cr+6	99.4	NJ-	20.1	NJ-
LD001A 4-4.5	JB53979-15	Cr+6	23.1	NJ-	14.6	NJ-
LD001A 5-5.5	JB53979-16	Cr+6	6.1	NJ-	4.1	NJ-
LD001A 6-6.5	JB53979-17	Cr+6	< 0.52	NJ-	< 0.52	NJ-

< – The analyte was analyzed for, but not detected at the specified reporting limit.

NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; potential low bias.

Review of Table 6 indicates that the Cr+6 results from both the initial and the re-analysis are remarkably comparable, even considering the potential for disparities attributable to soil sample non-homogeneity. The only significant disparity seems to be between the Cr+6 results for sample JB53979-14, LD001A 3-3.5.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

AECOM, 2010, ***Field Sampling Plan / Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites, Hudson County, New Jersey***, dated June 2010.

APHA, AWWA, and WEF, 1995, ***Standard Methods for the Examination of Water and Wastewater, 19th Edition***, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, ***Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium***, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, ***Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16***, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, ***Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4***, Trenton, New Jersey.

US EPA, CLP, 2010, ***"National Functional Guidelines for Inorganic Superfund Data Review"***, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, ***Validation of Metals for the Contract Laboratory Program (CLP) based on SOWILMO5.3, SOP HW-2, Revision 13***, September 2006.

US EPA, 1998, ***"Guidance for Data Quality Assessment, Practical Methods for Data Analysis"***, EPA QA/G-9 QA97 Version, Office of Research and Development, EPA/600/R-96/084, January 1998.

US EPA, 1997, ***Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III***, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 53979

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.
- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

3 samples were diluted because Cr⁺⁶ result was above calibration range. (5x)
JB 53979 - 1, 13, 14.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Seven nickel : JB 53979 - 1, 3, 4, 10, 13, 14, 15

two vanadium : JB 53979 - 1, 10

Six Cr⁺⁶ : JB 53979 - 1, 3, 10, 13, 14, 15 Five Reanalysis Cr⁺⁶
JB 53979 - 1R, 3R, 10R, 13R, 14R

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding AR limit exceedances.

No problems with analytical procedures were noted.

8. Were qualified data used?..... Yes No
9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. *Not applicable*
10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 For Hex Chrome, data were rejected because spike recovery was <50%.
 Data were rejected due to missing deliverables.
 Data were rejected but an applicable standard exceedance exists.
 Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
12. Were the QC Summary Forms reviewed?..... Yes No
13. Internal Standards acceptable..... Yes No
14. MS/MSD acceptable..... Yes No
15. Calibration summaries acceptable..... Yes No
16. Serial dilutions acceptable..... Yes No
17. Inorganic duplicates acceptable..... Yes No
18. LCS recovery acceptable..... Yes No
19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 4, and 5 for details.

Qualified sample results are presented in Tables 3 and 6 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDG JB53997
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Mercury, EPA Method 7471B
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Faiza M. Botros
Janis V. Giga, Ph.D., REP5554
Date: March 4, 2014

This data validation (DV) report presents the data review and result qualifications for one (1) solid sample (referred to as "nodules") collected at the Jersey City PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on November 22, 2013 for sample delivery group (SDG) JB53997. The sample was analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey.

Summary of Sample Results Qualifications

The solid (nodules) sample analytical results for the sample of SDG JB53997 were found to be compliant with the analytical method (SW-846 Method 6010C) for the analysis of metals in the one collected solid sample, as well as mercury (7471B) and hexavalent chromium (7196A).

Following the detailed DV review, the following sample results were qualified:

- Antimony, copper, iron, and lead (NJ-) in Sample JB53997-1;
- Mercury (NJ+) in Sample JB53997-1.

The hexavalent chromium (Cr⁺⁶) and mercury results in the solid sample did not require qualification, since all QC requirements were met for these analyses.

The qualified sample results that were subject to qualification following the DV review are presented in Table 3. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

Sample Receipt

The one (1) solid sample collected on November 22, 2013, was received November 22, 2013 at the Accutest laboratory in Dayton, NJ with acceptable sampling cooler temperatures of 4°C. The field sample identification number and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

Client Sample Designation	Sample Lab ID Number	Date Collected	Matrix	Analyses
107 NODULES	JB53997-1	11/22/13	Solid	Metals, Hg, Cr ⁺⁶
Metals – 22 target metals analyzed by EPA SW-846 Method 6010C at Accutest Laboratories in Dayton, NJ Cr ⁺⁶ – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential; Hg - Mercury analysis using EPA SW-846 Method 7471B.				

Data Review

Data, as presented in the analytical data package SDG JB53997, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP), SOP HW-2, Revision XIII* (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial Dilution |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The solid ("nodules") sample was analyzed for 22 target EPA Method 6010C metals, mercury using EPA Method 7471B, as well as percent total solids. The site remediation standards (SRS) of 31 mg/Kg for nickel, 78 mg/Kg for vanadium, and 20 mg/Kg for hexavalent chromium were exceeded in the solid sample of this SDG. Since the only sample of this SDG was not diluted, all reporting limits were below the respective SRS criteria values.

Laboratory Case Narrative

The following items were mentioned in the Case Narrative of this SDG (JB53997) data package for the metals analyses:

The matrix spike and matrix spike duplicate recoveries for antimony, copper, iron and lead for non-client QC sample JB53994-1 in QC Batch MP762350 were outside control limits indicating possible matrix interference and/or sample non-homogeneity. Although the MS/MSD recoveries for calcium, magnesium and zinc were outside control limits, the spike amounts were low relative to sample concentrations. The RPD for zinc was outside (laboratory) QC limits for the spiked duplicate sample indicating possible sample non-homogeneity.

The case narrative listed the following metals as exceeding the QC limit in the serial dilution analysis of the QC sample: selenium, silver, sodium, and thallium. However, the percent difference results were acceptable due to low initial sample concentration (< 50 times IDL).

The matrix spike recovery of the mercury analysis was outside control limits, indicating possible matrix interference. The case narrative stated that the RPD for mercury was outside control limits for the MSD. This statement actually referred to the RPD value of the spiked duplicate in the mercury analysis. However, the RPD value of 29.8 %RPD is still below the QC limit for, duplicate analysis of 35%RPD for solid matrix samples. All other QC requirements were met during the mercury analysis.

These issues are detailed in the discussion below.

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for the inductively coupled argon plasma (ICP) spectrometer analysis, as well as the 28-day holding time for mercury analysis.

Calibration Standards (QC Limits 90-110%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the solid sample analyses and acceptable analyte quantitation (concentration determination), except for the recoveries identified below.

The exceptions included three calibration check standard recoveries in analytical run MA32772 for thallium. The recoveries (150%, 0%, and 170%) were outside QC limits for CRI standards (70-

130%), but did not significantly affect the reported results. The "CRI" standard recoveries associated with JB53997 did not affect the thallium results because the reporting limit for the non-detect thallium result in the sample (< 1.2 mg/Kg) was above the affected range of approximately 0-0.46 mg/Kg and, thus, associated results are not subject to qualification.

A low 86.8% magnesium recovery in this analytical sequence did not affect PPG sample results, since this CCV standard was not associated with sample JB53997-1, because the sample analysis was bracketed by two acceptable CCV recoveries. Thus, no qualification of sample results associated with calibration issues is warranted.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank or the continuing calibration blanks at the stated reporting limits, such that no solid sample results warranted qualification for any associated QC blank contamination in SDG JB53997.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The matrix spike and matrix spike duplicate (MS/MSD) recoveries for antimony, copper, iron, and lead were below the DV QC limits for a non-client soil sample JB53994-1A in QC Batch MP76350, as presented in Table 2. The case narrative identified calcium, magnesium, and zinc as having MS/MSD recoveries outside QC limits. However, the initial sample concentrations were more than four times the spike amount (> 4 × spike) and consequently, the sample results are not subject to qualification due to potential masking of the recoveries by the elevated sample concentrations (USEPA, 2010; NJDEP, 2002). The antimony, copper, iron, and lead matrix spike recoveries indicate possible matrix interference and/or possible sample non-homogeneity. None of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits to indicate the possible presence of a possible bias in the ability to recovery the particular analyte in the given sample matrix. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP76350 Ω	JB53994-1A	Antimony	34.0 %	35.7 %	NJ-	Low
MP76350 Ω	JB53994-1A	Copper	30.5 %	17.3 %	NJ-	Low
MP76350 Ω	JB53994-1A	Iron	74.2 %	108.4 %	NJ-	Low
MP76350 Ω	JB53994-1A	Lead	- 24.1 %	- 22.0 %	NJ-	Low
MP76437 †	JB53999-2A	Mercury	207.4 %	402.4 %	NJ+	High

Data validation QC Limits are 75-125%;
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias;
 NJ+ – The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias;
 MS – Matrix spike;
 MSD – Matrix spike duplicate;
 Ω – The sample associated with QC Batch MP76398 consists of JB53997-1.
 † – The sample associated with QC Batch MP76437 consists of JB53997-1.

The recoveries of antimony, copper, iron, and lead in the MS/MSD samples in the QC batch are associated with the solid ("nodules") sample of this SDG, as presented in Table 3 below. Based on the DV guidelines available for SW-846 inorganic analyte analysis (NJDEP, 2002), the antimony, copper, iron, and lead results in the associated sample (JB53997-1) were flagged with "N" to indicate that the sample result is associated with a matrix spike recovery outside QC limits. The sample results are further qualified as estimated values and flagged with "J-" following the DV evaluation for a possible low bias in the ability to recover these four analytes in the associated solid sample, as presented below in Table 3. Even though the lead recovery was a negative value, the associated sample result was qualified as an estimated value because lead was detected in the sample. Had the lead result been a non-detect result, consideration would have been given to rejection, although there is no lower limit for MS recoveries that would recommend rejection of a sample result (NJDEP, 2002).

All remaining matrix spike recoveries for the target analytes were within QC limits of 75-125%, indicating acceptable analytical accuracy for this SDG.

Duplicate analysis (QC Limit \leq 35 %RPD)

A spiked duplicate analysis was performed on a non-client sample (JB53994-1A) for the QC batch associated with the solid sample of this SDG, such that analytical precision could be evaluated. The difference between the spiked duplicate sample were below the laboratory QC limit of 20%RPD reported by the laboratory, for all analytes, except zinc (24.15%RPD), as well as below the 35%RPD QC limit recommended in DV guidelines (USEPA, 2010). Since the RPD values between the spiked duplicate recoveries ranged from 0%RPD to 13.7%RPD, excluding the zinc value, the results demonstrate acceptable analytical precision for this analysis

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 86.4% - 118.8%.

Serial Dilution Analysis (QC Limit \leq 10 %D)

The case narrative stated that the serial dilution results for selenium, silver, sodium, and thallium were outside control limits, but that the percent difference (%D) results were acceptable due to low initial sample concentration ($<$ 50 times IDL). Consequently, no sample results warranted qualification for serial dilution analysis results.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported vanadium results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

where: C = Raw instrument reading ($\mu\text{g/L}$)
V = final volume (mL)
DF = Dilution factor
W = wet weight (g)
TS = Total solids (%)
1000 = conversion factor (mL/L)

The vanadium concentration for Sample 107 NODULES (JB53997-1) was listed as 124 mg/Kg on the reporting form and 1.073 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Vanadium (mg/Kg)} = \frac{(1.073 \mu\text{g/L})(100 \text{ mL})(1)}{1000(\text{mL/L})(0.97 \text{ g})(89.2\%/100\%)} = 124.0118 \mu\text{g/g}$$

$$= 124 \text{ mg/Kg, dry weight}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 124 mg/Kg for Sample "107 NODULES" was correctly reported.

Mercury

Sample mercury concentrations reported on the Form 1 sheets were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the validation activity. The soil mercury results appear to be correctly reported.

The following equation was used to verify the reporting of mercury results in solid samples:

$$\text{Mercury (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times \text{TS}/100\%}$$

where: C = Raw instrument reading (μg/L)
 V = final volume (mL)
 DF = Dilution factor
 W = wet weight (g)
 TS = Total solids (%)

The mercury result for Sample "107 NODULES" (JB53997-1) was listed as 0.066 mg/Kg on the reporting form (Form I) and 0.3866 mg/L on the quant report. A calculation check provides the following result for the detected mercury result:

$$\text{Mercury (mg/Kg)} = \frac{(0.3866 \mu\text{g/L})(100 \text{ mL})(1)}{1000(\text{mL/L})(0.6544 \text{ g})(89.2\%/100\%)}$$

$$= \frac{38.66}{583.725} = 0.0662298 \mu\text{g/g}$$

$$= 0.06623 \text{ mg/Kg dry weight, which is rounded to a reported result of } 0.066 \text{ mg/Kg}$$

The reported detected mercury concentration of 0.066 mg/Kg for Sample "107 NODULES" was thereby verified by this calculation check.

Summary of Metals Results

The sample analytical results for the solid ("nodules") sample of SDG JB53997 were found to be compliant with the analytical methods for the analysis of metals in the solid sample using SW-846 Method 6010C. QC criteria were met for all ICP target analyte analyses, except for the low matrix

spike recoveries for antimony, copper, iron, and lead in the QC sample and the elevated MS recovery for mercury that was above QC limits. The antimony, copper, iron, and lead results are qualified as estimated values and flagged with "NJ-" in JB53997-1 due to a possible low bias in the ability to recover these four analytes, while the mercury results are qualified as estimated values and flagged with "NJ+" due to possible positive (high) bias in the ability to recover mercury from a solid sample matrix, as presented below in Table 3.

Table 3. Summary of Qualified "Nodules" Soil Sample Results in SDG JB53997

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
107 NODULES	JB53997-1	Antimony	< 2.3	NJ-
107 NODULES	JB53997-1	Copper	22.8	NJ-
107 NODULES	JB53997-1	Iron	24,500	NJ-
107 NODULES	JB53997-1	Lead	15.1	NJ-
107 NODULES	JB53997-1	Mercury	0.066	NJ+

Key:
 < – The analyte was analyzed for, but was not detected at the stated reporting limit.
 NJ- - The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias;
 NJ+ - The matrix spike recovery was above QC limits; associated sample results may experience a potential high bias.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The sample was analyzed in one QC batch for the soil sample.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | √ Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected at 457 mg/Kg in this solid ("nodules") sample analyzed in SDG JB53997. This Cr⁺⁶ result had exceeded the SRS of 20 mg/Kg in this one (1) solid sample.

Case Narrative

The case narrative indicated that the QC requirements were met for issues such as holding time, method blank, blank spike recoveries and the %RPDs of the duplicate control samples. The matrix spike recovery for the insoluble Cr⁺⁶ was within the QC limits. However, the matrix spike recovery of the soluble Cr⁺⁶ was high (135%), due low spike amount relative to the sample concentration. All other QC requirements were met for the associated samples.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient of 0.9999; a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered both at 103.3% in the QC batch GP76398, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in any of the method blanks (< 0.40 mg/Kg), any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike recovery for the insoluble Cr⁺⁶ was within the QC limits of 75-125%, as well as post-spike recoveries that were within the 85-115% QC limits. However, the matrix spike recovery for the soluble Cr⁺⁶, as presented below in Table 4, was above the QC limits. However, the associated sample results are not subject to qualification, because the initial sample Cr+6 concentration was more than four times the spike amount (NJDEP, 2005). The elevated MS recovery may be attributable to masking of the spike by the large initial sample concentration. Thus, no hexavalent chromium results required qualification based on the results of the MS recoveries.

Table 4. Hexavalent Chromium Analysis Matrix Spike Recovery Results – SDG JB53997

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76398 Ω	JB53997-1	Cr ⁺⁶ , soluble	135.4 %	----	***
GP76398 Ω	JB53997-1	Cr ⁺⁶ , insoluble	96.5 %	----	----
GP76398 Ω	JB53997-1	Cr ⁺⁶ , post-digestion spike	95.4%	----	----

QC Limits are 75-125% (soil) for MS recovery; 85-115% for post spike recovery.
MS – Matrix spike
Cr⁺⁶ – Hexavalent chromium
*** – Sample concentration > 4× spike amount; sample results not subject to qualification;
Ω – The sample associated with QC Batch MP76398 consists of JB53997-1.

Duplicate Sample Analysis

The duplicate analysis was performed on one set of duplicate samples. The %RPD value for the QC batch GP76398 was within the QC limits of 35%RPD for soil samples (USEPA, 2010; AECOM, 2010). Thus, no hexavalent chromium results warranted qualification in this SDG for any duplicate analysis issues

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits; with recoveries ranging 93.9% to 97.3%, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No sample Cr⁺⁶ results were qualified for serial dilution analysis results, as it appears that a serial dilution analysis was not performed in the analytical sequence. Serial dilution is not a requirement of the analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calibration curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample 107 NODULES (JB53997-1) was listed as 457 mg/Kg on the reporting form and 0.3941 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.3914 \text{ mg/L} \times 0.1 \text{ L} \times 25}{0.00240 \text{ Kg} \times 89.2/100} = \frac{0.9785}{0.00214} = 457.24 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 457 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 457 mg/Kg for Sample 107 NODULES was correctly reported. Thus, this detected Cr⁺⁶ concentration result was above the SRS of 20 mg/Kg. Please note that this sample required a 1:25 dilution in order for the response to fall within the calibration range of the instrument.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh result was verified and found to be represented correctly on the Eh/pH phase diagram. No disparities relative to the reported value and characteristic was observed.

This sample was observed to fall below the Eh-pH phase diagram line. This result suggests that sample 107 NODULES experiences a condition of reducing soil environment. Thus, the hexavalent chromium result is considered acceptable as reported with the hexavalent chromium concentration of 457 mg/Kg was above the SRS of 20 mg/Kg.

Summary for Hexavalent Chromium Analysis

The 135% soluble matrix spike recovery value for Cr⁺⁶ was above the QC limits (75-125%). This high matrix spike recovery is due to the low spike amount relative to the sample concentration. However, the associated sample results are not subject to qualification, because the initial sample Cr⁺⁶ concentration was more than four times the spike amount (NJDEP, 2005). The elevated MS recovery may be attributable to masking of the spike by the large initial sample concentration.

All other QC results associated with the hexavalent chromium analysis were within QC limits. Consequently, sample results were not impacted and no qualification was needed for the Cr+6 results in SDG JB53997.

3.0 Data Qualifier Definitions

The absence of qualifiers indicates that the reported sample results are acceptable both qualitatively and quantitatively.

Qualifier	Description
<	The compound was analyzed, but was not detected at the stated reporting limit.
J	The result is an estimated value.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
E	The reported value is estimated because of the presence of interference.

4.0 References

APHA, AWWA, and WEF, 1995, *Standard Methods for the Examination of Water and Wastewater, 19th Edition*, Washington, D.C., 1268 p.

New Jersey Department of Environmental Protection, 2005, *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium*, Trenton, New Jersey, August 2005.

New Jersey Department of Environmental Protection, 2002, *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16*, Trenton, New Jersey.

New Jersey Department of Environmental Protection, 2001, *Standard Operating Procedure for the Analytical Data Validation of Target Analyte List - Inorganics BEMQA 5.A.2, Revision 4*, Trenton, New Jersey.

US EPA, CLP, 2010, *“National Functional Guidelines for Inorganic Superfund Data Review”*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010.

US EPA, 2006, *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3, SOP HW-2, Revision 13*, September 2006.

US EPA, 1997, *Test Methods for Evaluating Solid Wastes, 3rd Edition including Final Update III*, Office of Solid Waste and Emergency Response, Washington, D.C., June 1997.

US EPA, 1992, *Guidance for Data Usability in Risk Assessment (Part A) Final*, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB53997

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times (for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.
- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Nickel and vanadium in JB53997-1.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

*Refer to DV report discussions of case narrative regarding QC limit exceedances.
No analytical procedural problems were noted.*

8. Were qualified data used?..... Yes No

9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Not applicable

10. Were rejected data used?..... Yes No

If "yes", please indicate reasons rejected data were used:

- For Hex Chrome, data were rejected because spike recovery was <50%.
- Data were rejected due to missing deliverables.
- Data were rejected but an applicable standard exceedance exists.
- Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
- Other reasons not noted directly above. Explain:

11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No

12. Were the QC Summary Forms reviewed?..... Yes No

13. Internal Standards acceptable..... Yes No

14. MS/MSD acceptable..... Yes No

15. Calibration summaries acceptable..... Yes No

16. Serial dilutions acceptable..... Yes No

17. Inorganic duplicates acceptable..... Yes No

18. LCS recovery acceptable..... Yes No

19. Other QC acceptable?..... Yes No

Provide a brief explanation, if applicable.

Refer to DV report table 2 for details.

Qualified sample results are presented in Table 3 of the DV report.



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DATA VALIDATION REPORT

Project: Jersey City PPG, Site 107; Report SDGs JB54625/JB54625R/JB54625RT
Sample Date: December 2 and 3, 2013
Analyses: Metals Analysis, EPA Method 6010C
Hexavalent Chromium Analysis, EPA Method 3060A/7196A
Redox Potential, ASTM D1498-76M
pH, EPA Method 9045C,D
Percent Solids, SM2540 G-97
Reviewer: Janis V. Giga. Ph.D., REP5554
Report Date: February 23, 2014

This data validation (DV) report presents the data review and result qualifications for seventeen (17) soil samples collected at the PPG Site 107 (18 Chapel Avenue) in Jersey City, New Jersey on December 2 and 3, 2013 for sample delivery group (SDG) JB54625. The samples were analyzed for the analytes listed above employing the identified analytical methods by Accutest Laboratories of Dayton, New Jersey.

Summary of Sample Results Qualifications

The soil sample analytical results for the samples of SDG JB54625 were found to be compliant with the analytical methods employed for the analysis of metals and hexavalent chromium (Cr⁺⁶) in the 17 collected soil samples and one field blank.

Following the detailed DV review, the following sample results were qualified:

- Antimony, chromium, and thallium (NJ-) in Samples JB54625-1 through -17 (inclusive);
- Hexavalent chromium (NJ-) in Samples JB54625-1 through -17 (inclusive);
- Hexavalent chromium (NJ-) in reanalyzed Samples JB54625-1R through -17R (inclusive)

No other sample results in SDG JB54625 required qualification. Details are provided in the tables and text below. The reported concentrations were below the respective site remediation standard (SRS) limits, except for twelve nickel, three vanadium and five hexavalent chromium (Cr⁺⁶) results. A data validation checklist is provided in Attachment A to summarize the observations during the DV review.

The sample results that were subject to qualification following the DV review are presented in Tables 3 and 6 of this DV report.

Sample Receipt

The seventeen (17) soil samples collected December 2 and 3, 2013 were received at the Accutest laboratory on December 3, 2013 with acceptable sampling cooler temperatures of 1°C. The field

sample identification numbers and corresponding laboratory identification numbers are as follows:

Table 1. Sample Receipt Summary

<u>Client Sample Designation</u>	<u>Sample Lab ID Number</u>	<u>Date Collected</u>	<u>Matrix</u>	<u>Analyses</u>
ED015 0"-6"	JB54625-1	12/2/13	Soil	Metals, Cr+6
ED015 2-2.5	JB54625-2	12/2/13	Soil	Metals, Cr+6
ED015 8-8.5	JB54625-3	12/2/13	Soil	Metals, Cr+6
ED013 8-8.5	JB54625-4	12/2/13	Soil	Metals, Cr+6
ED013 10-10.5	JB54625-5	12/2/13	Soil	Metals, Cr+6
ED013 14-14.5	JB54625-6	12/2/13	Soil	Metals, Cr+6
GD011 0.5-1	JB54625-7	12/3/13	Soil	Metals, Cr+6
GD011 2-2.5	JB54625-8	12/3/13	Soil	Metals, Cr+6
GD011 4-4.5	JB54625-9	12/3/13	Soil	Metals, Cr+6
GD011 6-6.5	JB54625-10	12/3/13	Soil	Metals, Cr+6
ED010 4-4.5	JB54625-11	12/3/13	Soil	Metals, Cr+6
ED010 5-5.5	JB54625-12	12/3/13	Soil	Metals, Cr+6
ED010 7-7.5	JB54625-13	12/3/13	Soil	Metals, Cr+6
ED008 5-5.5	JB54625-14	12/3/13	Soil	Metals, Cr+6
ED008 6-6.5	JB54625-15	12/3/13	Soil	Metals, Cr+6
ED008 7-7.5	JB54625-16	12/3/13	Soil	Metals, Cr+6
ED008 8-8.5	JB54625-17	12/3/13	Soil	Metals, Cr+6
Metals – Antimony, chromium, nickel, thallium and vanadium analyzed by SW-846 Method 6010C.				
Cr+6 – Hexavalent chromium analyzed by SW-846 Method 7196A at Accutest Laboratories in Dayton, NJ together with pH and redox potential.				

Data Review

Data, as presented in the analytical data package SDG JB54625, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods)*, SOP No. 5.A.16 (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) “*National Functional Guidelines for Inorganic Data Review*”, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP HW-2, Revision XIII (USEPA, 2006).
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2005);

Data associated with parameters that do not meet quality control (QC) specifications or compliance requirements, have been qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate.

The analysis of the identified samples was performed in compliance with the requirements specified in the respective analytical methods. The data package in a NJDEP full deliverables package is considered complete, as presented. The information presented in the data summary

and quality control (QC) verification forms was supported by the raw data. The quality of data collected in support of this sampling activity is considered acceptable with the noted qualifications.

The discussion below presents the findings of the data validation review organized according to the technical areas used to evaluate inorganic analytical data. For each of these analytical topics, the information on the summary forms, as well as the raw data and supporting information for each sample or standard analyzed were reviewed during the DV effort.

1.0 Metals Analysis Data Review

The data validation of the metals analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements:

- | | |
|---------------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Serial dilution analysis |
| √ ICP Interference Check Sample | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

The soil samples were analyzed for five target EPA Method 6010C metals (antimony, total chromium, nickel, thallium, and vanadium), as well as percent total solids. Several sample results exhibited concentrations above the respective site remediation standard (SRS) in some of the 17 soil samples of this SDG. These include twelve nickel and three vanadium results that exceeded the SRS criteria of 31 mg/Kg and 78 mg/Kg, respectively.

Laboratory Case Narrative

The case narrative stated that the matrix spike (MS) recovery for antimony, and the matrix spike duplicate (MSD) recoveries for antimony, chromium and thallium were identified as being outside QC limits in QC Batch MP76525 indicating possible matrix interference and/or sample non-homogeneity. The case narrative stated that the RPD for antimony and thallium in the serial dilution analysis were outside control limits, but the percent difference was acceptable due to low initial sample concentration (< 50 times IDL).

Holding times (QC Limit 6 months)

The six-month analytical holding time was met for all ICP samples.

Calibration Standards (QC Limits 90-110%; CRI QC Limit 70-130%)

All QC calibration requirements were met by the initial and continuing calibrations employed, including those of the "low calibration check standard" ("CRI" standard), with target analyte recoveries all within the respective required QC limits, thereby demonstrating linearity for the soil sample analyses and acceptable analyte quantitation (concentration determination), except for the thallium detected in some continuing calibration blanks (CCBs) identified below in MA32866 and MA32880 and the low CRDL standard recovery for thallium and an elevated recovery for antimony in analytical sequence MA32884.

Thallium was detected in two CCBs of analytical sequence MA32866 as well as one CCB of MA32880. However, the samples analyzed in sequence MA32866 exhibited only non-detect thallium results and the samples were bracketed by CCBs with non-detect thallium results, such that the samples were not associated with the CCBs exhibiting the detected thallium results. The PPG samples of JB54625 analyzed in sequence MA32880 were analyzed for thallium, but the

affected samples were not associated with the CCB exhibiting the detected thallium concentration. Thus, no thallium results were subject to qualification for this CCB issue.

The CRDL standard (CRID3) recovery for thallium was 0%, a value below the DV QC limits of 70-130%. There were three PPG samples analyzed in the affected sequence, JB54625-1, -2, and -3. Since thallium was not detected in these three samples and the reporting limit of approximately < 1.0 mg/Kg was above the estimated affected range of 0-0.4 mg/Kg, the thallium results are not subject to qualification. In addition, antimony in CRID2 recovered 133%. Since antimony was not detected in any of the three associated samples, with a reporting limit above the affected range (true ± CRQL) as well, the antimony results were not subject to qualification (USEPA, 2010).

Hence, no soil sample results warranted qualification for any calibration issues.

Quality Control Blanks (QC Limit < CRDL or <RL)

There were no target metals concentrations detected in the procedure blank, the continuing calibration blanks, or the field blank at the stated reporting limits, such that no soil sample results warranted qualification for any associated QC blank contamination in SDG JB53979.

ICP Interference Check Samples (QC Limits 80-120%)

All analyte recoveries in the interference check samples, both IND A and IND B, were within the specified QC limits for the target compounds.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis
(QC Limits 75-125% Recovery; ≤ 35%RPD)

The MS recovery for antimony, and the MSD recoveries for antimony, chromium and thallium were identified as being outside QC limits in QC Batch MP76525, indicating possible matrix interference and/or sample non-homogeneity. The matrix spike recoveries below QC limits are presented in Table 2. The remaining matrix spike results fell within QC limits.

Table 2. Matrix Spike Recovery Results Outside QC Limits

QC Batch	QC Sample	Analyte	MS Recovery	MSD Recovery	DV Qualifier	Potential Bias
MP76525 Ω	JB54625-1	Antimony	40.5 %	35.0 %	NJ-	Low
MP76525 Ω	JB54625-1	Chromium	95.5 %	73.6 %	NJ-	Low
MP76525 Ω	JB54625-1	Thallium	77.0 %	74.4 %	NJ-	Low

QC Limits are 75-125%; Post-digestion spike QC is 80-120%
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 MSD – Matrix spike duplicate
 Ω – The samples associated with QC Batch MP76525 consist of JB54625-1 through -17 (inclusive);

Since none of the associated results had been flagged with the laboratory 'N' flag, as is customary in reporting metals results associated with matrix spike recoveries outside QC limits, the sample results subject to qualification for low spike recoveries were flagged with "N" following the DV review to indicate that the result is associated with QC recovery outside QC limits and further flagged with "J-" to indicate the possible presence of a possible low bias in the ability to recover the antimony in the given sample matrix, in accordance with DV guidelines (USEPA, 2010; NJDEP, 2002). These qualified results are presented below in summary table, Table 3.

Duplicate analysis (QC Limit ≤ 35 %RPD)

The duplicate soil sample analysis was performed on one spiked duplicate sample from PPG sample JB54625-1 in an attempt to assess the analytical precision. The %RPD values ranged from 5.5 to 16.5 %RPD, values all well below the QC limit of 35%RPD for soil samples and the associated results did not require qualification. The duplicate analyses demonstrated acceptable analytical precision.

Laboratory control samples (QC Limits 80-120% Recovery)

All analyte recoveries in the laboratory control samples were within the specified QC limits demonstrating acceptable analytical system performance, with recoveries ranging 80.6% - 87.6%.

Serial Dilution Analysis (QC Limit ≤ 10 %D)

The case narrative stated that the RPDs for antimony and thallium in the serial dilution analysis were outside control limits, but the percent difference was acceptable due to low initial sample concentration (< 50 times IDL). All other results for the serial dilution analysis were within QC limits, thus, no sample results were qualified for any serial dilution issues.

Quantification Verification

Sample metals concentrations reported on the Form 1 sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported vanadium results:

$$\text{Vanadium (mg/Kg)} = \frac{C \times V \times DF}{1000 \times W \times TS/100\%}$$

- where: C = Raw instrument reading (µg/L)
- V = final volume (mL)
- DF = Dilution factor
- W = wet weight (g)
- TS = Total solids (%)
- 1000 = conversion factor (mL/L)

The vanadium concentration for Sample ED015 8-8.5 (JB54625-3) was listed as 78.0 mg/Kg on the reporting form, a value equal to the SRS criterion for vanadium in soils, and 0.7813 mg/L on the quantitation report in the raw data. A calculation check provides the following result:

$$\begin{aligned} \text{Vanadium (mg/Kg)} &= \frac{(781.3 \mu\text{g/L})(100 \text{ mL}) (1)}{1000(\text{mL/L}) (1.47 \text{ g}) (68.1\%/100\%)} = 78.0465 \mu\text{g/g} \\ &= 78.0 \text{ mg/Kg dry weight} \end{aligned}$$

After rounding to three significant figures, this verifies that the vanadium concentration of 78.0 mg/Kg for Sample ED015 8-8.5 was correctly reported. This value is equal to the SRS of 78 mg/Kg. Vanadium was detected in two other samples above the SRS criterion.

Reporting Limits

No samples destined for metals analysis required dilution at the Accutest laboratory in Dayton, NJ, such that all reporting limits were below the respective SRS values.

Summary

The soil sample analytical results for the samples of SDG JB54625 were found to be compliant with the analytical methods for the analysis of metals in the seventeen soil samples using SW-846 Method 6010C.

The QC criteria were met for all ICP target analyte analyses, except for the low MS recovery for antimony and the low MSD recoveries for antimony, chromium and thallium in the QC sample JB54625-1 of QC Batch MP76525. Sample results were qualified based on the results of the QC sample such that the 17 soil samples collected December 2 and 3, 2013 are qualified as estimated values for antimony, chromium and thallium (flagged "NJ-") in the associated 17 soil samples due to a potential low bias, as indicated below in Table 3.

Table 3. Summary of Qualified Sample Metals Results in SDG JB54625

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED015 0"-6"	JB54625-1	Antimony	< 2.3	NJ-
ED015 0"-6"	JB54625-1	Chromium	31.2	NJ-
ED015 0"-6"	JB54625-1	Thallium	< 1.1	NJ-
ED015 2-2.5	JB54625-2	Antimony	< 2.0	NJ-
ED015 2-2.5	JB54625-2	Chromium	169	NJ-
ED015 2-2.5	JB54625-2	Thallium	< 0.98	NJ-
ED015 8-8.5	JB54625-3	Antimony	< 2.0	NJ-
ED015 8-8.5	JB54625-3	Chromium	891	NJ-
ED015 8-8.5	JB54625-3	Thallium	< 1.0	NJ-
ED013 8-8.5	JB54625-4	Antimony	< 2.0	NJ-
ED013 8-8.5	JB54625-4	Chromium	87.7	NJ-
ED013 8-8.5	JB54625-4	Thallium	< 1.0	NJ-
ED013 10-10.5	JB54625-5	Antimony	2.3	NJ-
ED013 10-10.5	JB54625-5	Chromium	558	NJ-
ED013 10-10.5	JB54625-5	Thallium	< 0.98	NJ-
ED013 14-14.5	JB54625-6	Antimony	3.1	NJ-
ED013 14-14.5	JB54625-6	Chromium	1200	NJ-
ED013 14-14.5	JB54625-6	Thallium	< 1.0	NJ-
GD011 0.5-1	JB54625-7	Antimony	< 1.9	NJ-
GD011 0.5-1	JB54625-7	Chromium	46.5	NJ-
GD011 0.5-1	JB54625-7	Thallium	< 0.97	NJ-
GD011 2-2.5	JB54625-8	Antimony	< 2.3	NJ-
GD011 2-2.5	JB54625-8	Chromium	42.2	NJ-
GD011 2-2.5	JB54625-8	Thallium	< 1.1	NJ-
GD011 4-4.5	JB54625-9	Antimony	< 2.2	NJ-
GD011 4-4.5	JB54625-9	Chromium	610	NJ-
GD011 4-4.5	JB54625-9	Thallium	< 1.1	NJ-
GD011 6-6.5	JB54625-10	Antimony	< 1.9	NJ-
GD011 6-6.5	JB54625-10	Chromium	31.5	NJ-
GD011 6-6.5	JB54625-10	Thallium	< 0.97	NJ-
ED010 4-4.5	JB54625-11	Antimony	< 1.9	NJ-
ED010 4-4.5	JB54625-11	Chromium	436	NJ-
ED010 4-4.5	JB54625-11	Thallium	< 0.97	NJ-
ED010 5-5.5	JB54625-12	Antimony	< 1.9	NJ-
ED010 5-5.5	JB54625-12	Chromium	491	NJ-
ED010 5-5.5	JB54625-12	Thallium	< 0.97	NJ-
ED010 7-7.5	JB54625-13	Antimony	< 2.0	NJ-

Sample ID	Lab ID	Analyte	Result (mg/Kg)	DV Qualifier
ED010 7-7.5	JB54625-13	Chromium	748	NJ-
ED010 7-7.5	JB54625-13	Thallium	< 1.0 †	NJ-
ED008 5-5.5	JB54625-14	Antimony	4.4	NJ-
ED008 5-5.5	JB54625-14	Chromium	1800	NJ-
ED008 5-5.5	JB54625-14	Thallium	< 1.2	NJ-
ED008 6-6.5	JB54625-15	Antimony	< 2.4	NJ-
ED008 6-6.5	JB54625-15	Chromium	62.3	NJ-
ED008 6-6.5	JB54625-15	Thallium	< 1.2	NJ-
ED008 7-7.5	JB54625-16	Antimony	< 2.0	NJ-
ED008 7-7.5	JB54625-16	Chromium	72.4	NJ-
ED008 7-7.5	JB54625-16	Thallium	< 0.98	NJ-
ED008 8-8.5	JB54625-17	Antimony	< 2.0	NJ-
ED008 8-8.5	JB54625-17	Chromium	62.3	NJ-
ED008 8-8.5	JB54625-17	Thallium	< 1.0	NJ-

Key:

< –The analyte was analyzed for, but was not detected above the stated reporting limit.

NJ- – The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.

No other soil sample target metals results required any qualification for any associated QC issues.

2.0 Hexavalent Chromium Analysis Data Review

The analysis for hexavalent chromium (Cr⁺⁶) was performed using US EPA Method 3060A for sample preparation and Method 7196A for soil sample analysis. The samples were analyzed in one QC batch for the soil samples.

The data validation of the analytical data was reviewed for the following data quality items and a check mark (√) indicates successful achievement of meeting the relevant QC requirements.

- | | |
|-----------------------------|------------------------------|
| √ Holding times | Matrix spike recoveries |
| √ Blank Analysis | √ Duplicate analysis |
| √ Calibration standards | √ Laboratory control samples |
| √ Calibration verification | √ Quantitation checks |
| √ Data package completeness | √ Data qualifiers |

Hexavalent chromium was detected in fourteen of the 17 soil samples, with five concentrations exceeding the SRS of 20 mg/Kg.

Case Narrative

The case narrative indicated that the QC requirements were met, including the holding time, method blanks, and matrix spike recoveries, except for the low soluble MS recovery in QC Batch GP76615. The RPD for the duplicate analysis in QC Batch GP76615 was outside QC limits, but the RPD was acceptable due to low duplicate and sample concentration.

Calibrations

The initial calibration demonstrated an acceptable correlation coefficient with a value exceeding 0.99982, a value greater than the calibration requirement for linearity of 0.995. Calibration check

standards recovered in the range of 95.4% to 96.1% for the QC batch associated with the 17 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blanks (< 0.40 mg/Kg) or any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike recoveries were within the QC limits of 75-125%, except for the soluble MS recovery for JB54625-1 in QC Batch GP76615 that was marginally below the QC limit range. The low soluble MS recovery for hexavalent chromium below the QC limits of 75-125% indicates possible matrix interference. The other matrix spike recoveries that were within the respective QC limits, are also presented in the summary table, Table 4.

Table 4. Matrix Spike Recovery Results for Cr+6 in SDG JB54625

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76615 ¥	JB54625-1	Cr ⁺⁶ , soluble	72.1 %	NJ-	Low
GP76615 ¥	JB54625-1	Cr ⁺⁶ , insoluble	85.0 %	----	----
GP76615 ¥	JB54625-1	Cr ⁺⁶ , post spike	98.2 %	----	----

QC Limits are 75-125% for MS recovery; 85-115% for post spike recovery
 NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
 MS – Matrix spike
 ¥ – The samples associated with QC Batch GP76615 consist of JB54625-1 through -17 (inclusive).

The soluble MS recovery of 72.1% was marginally below QC limits for Cr⁺⁶ for the spiked sample from sampling location ED015 0"-6" in the soil sample analysis in QC Batch GP76615 which was associated with 17 soil samples with lab sample IDs of JB54625-1 through -17 (inclusive). In consideration of the DV guidelines that are based on SW-846 Method 7196A (NJDEP, 2005), the hexavalent chromium results for the associated seventeen soil samples are, consequently, qualified as estimated values and flagged with "NJ-" due to the potential low bias in the ability to recover this analyte in the soil matrix. These qualified results are presented below in Table 6.

Duplicate Sample Analysis

The duplicate analysis was performed on PPG sample JB54625-1. All %RPD values were below the QC limit of 35%RPD for soil samples. The duplicate analysis demonstrated acceptable analytical precision with an RPD value of 26.1%RPD, as well as < 2 x CRQL, for Cr+6 and less than 0.4 %RPD for pH and redox potential, thereby demonstrating excellent analytical precision for the Cr+6, pH and redox potential analysis.

Laboratory Control Sample Analysis

The recoveries in the laboratory control samples (LCSs), also referred to as blank spikes, recovered within the 80-120% QC limits, with recoveries between 80.3% and 97.0% for the soil sample analyses, thereby demonstrating acceptable analytical system performance.

Serial Dilution Analysis

No serial dilution analysis was performed in either of the two QC batches. This is not a required analysis of the analytical method.

Sample Result Verification

Sample Cr⁺⁶ concentrations reported on the Form 1 (Report of Analysis) sheets for the samples were verified from the raw quantitation reports in the raw data and adjusted for percent solids during the data validation review activity. The following equation was used to verify reported Cr⁺⁶ results:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

Where: A = conc. from calib. curve (mg/L)
 B = Final digested volume (L)
 C = Wet wt of sample (Kg)
 D = % Solids/100
 E = Dilution (if necessary)

The detected hexavalent chromium concentration for Sample ED008 8-8.5 (JB54625-17) was listed as 75.1 mg/Kg on the reporting form and 0.7961 mg/L on the quantitation report in the raw data for a 2-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.7961 \text{ mg/L} \times 0.1 \text{ L} \times 2}{0.00258 \text{ Kg} \times 82.2/100} = \frac{0.15922}{0.0021208} = 75.07686 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 75.1 \text{ mg/Kg}$$

After rounding to three significant figures, this verifies that the hexavalent chromium concentration of 75.1 mg/Kg for Sample ED008 8-8.5 was correctly reported. This was the highest detected Cr+6 concentration detected among the 17 soil samples of this SDG, JB54625 analyzed for hexavalent chromium. This was one of five detected Cr+6 concentrations result above the SRS of 20 mg/Kg.

pH/Eh (ORP)

The calibrations for pH analysis were acceptable and the QC requirements were met for duplicate analysis. Standard mV solution checks for Eh analysis were acceptable and within the QC ranges, as were the duplicate sample analyses. The reported pH and Eh results were randomly verified and found to be represented correctly on the Eh/pH phase diagrams. No other disparities relative to the reported values and characteristics were observed. All results met the QC limits, such that no pH or redox potential (ORP) results are subject to qualification.

Each of the 17 soil samples were below the Eh/pH phase diagram line. These results suggest that all of the samples experience conditions of a "reducing" soil environment where the oxidation to Cr+6 is not favorable and observed concentrations of Cr+6 are not expected to increase. Of the five samples exceeding the SRS value, the highest detected Cr+6 concentration was 75.1 mg/Kg in JB54625-17; the total chromium result from its ICP analysis was only 62.3 mg/Kg, thereby limiting subsequent oxidation to Cr+6.

Summary of Cr+6 Results in SDG JB54625

Due to the low MS recovery for the soluble spike in QC Batch GP76615, the Cr⁺⁶ results in the associated 17 soil samples are qualified as estimated values and flagged with "NJ-" due to a potential low bias in the ability to recover Cr+6 from the given soil matrix. No other results were subject to qualification in the hexavalent chromium analyses for other issues, nor were the pH, redox potential or total solids results qualified. The Cr+6 results qualified due to low Cr⁺⁶ spike recoveries in the soluble MS analysis following the DV review are presented in Table 6 near the end of this DV report and compared to results from their reanalysis.

Because the soluble MS recovery values were below QC limits in QC batch GP76615, the samples required reanalysis where the resultant data are presented in SDG JB54625R and summarized in this report in sections below under the subsection labeled "SDG JB54625R".

SDG JB54625R

As a result of the soluble MS recovery in the initial soil sample analysis for hexavalent chromium being below the QC limit of 75% for the spike recovery associated with 17 soil samples, the 17 soil samples of SDG JB54625 were reanalyzed for hexavalent chromium. The soil samples numbered JB54625-1R through -17R were re-analyzed and the data submitted in a supplemental data package labeled JB54625R (R for reanalysis). The samples were re-prepped December 26, 2013 and analyzed on December 29, 2013 for Cr⁺⁶, within the 30-holding time for soil samples. The samples present in SDG JB54625R are identified in Table 1, but are labeled with the suffix 'R' in the laboratory sample ID number such as JB54625-1R for the reanalysis of client ID sample ED015 0"-6", which was the sample used as the QC sample in SDG JB54625. Hexavalent chromium was detected in 14 of the 17 soil samples reanalyzed with four Cr+6 results above the SRS of 20 mg/Kg.

The case narrative of SDG JB54625R indicated that the QC requirements were met for the reanalysis of the soil samples of SDG JB54625R, except that the soluble MS recovery was outside QC limits in the QC batch, as presented in Table 5 below.

Calibrations

The initial calibration for the QC batches in the analytical sequence of 12/2913 demonstrated an acceptable correlation coefficient with the value of 0.99981, a value greater than the calibration requirement for linearity of 0.995. Calibration check standards recovered in the range of 99.3% to 100.3% for the QC batch associated with the 17 soil samples, all meeting the continuing calibration QC requirement of 90-110%.

Quality Control Blanks

Hexavalent chromium was not detected in either the method blank (< 0.40 mg/Kg), or any of the continuing calibration blanks (< 0.010 mg/L). Thus, no sample results are affected or qualified for any potential QC blank contamination.

Matrix Spike Analysis

The matrix spike (MS) recovery for the soluble matrix spike was below QC limits in the re-analysis of JB54625-1R from soil sampling location ED015 0"-6", as noted in Table 5. Thus, the hexavalent chromium results for samples with laboratory sample ID numbers JB54625-1R through -17R (inclusive) are still subject to qualification as estimated values and to be flagged with "NJ-", due to the potential low bias in the ability to recover Cr+6 from the given soil matrix.

Table 5. Matrix Spike Recovery Results in SDG JB54625R

QC Batch	QC Sample	Analyte	MS Recovery	DV Qualifier	Potential Bias
GP76896 ϕ	JB54625-1R	Cr ⁺⁶ , soluble	63.6 %	NJ-	Low
GP76896 ϕ	JB54625-1R	Cr ⁺⁶ , insoluble	82.9 %	----	----
GP76896 ϕ	JB54625-1R	Cr ⁺⁶ , post spike	92.7 %	----	----

QC Limits are 75-125% for MS Recovery; 85-115% for post spike recovery.
NJ- – The matrix spike recovery was below QC limits; associated sample results may experience a potential low bias.
MS – Matrix spike
 ϕ – The samples associated with QC Batch GP76896 consist of JB54625-1R through -17R (inclusive).

The soluble MS recovery of 63.67% was below QC limits for Cr⁺⁶ for the spiked sample from sampling location ED015 0"-6" in the soil sample analysis in QC Batch GP76896 which was associated with 17 soil samples with lab sample IDs of JB54625-1R through -17R (inclusive).

These qualified Cr+6 results from the reanalysis are presented alongside those of the initial analysis in Table 6. The comparison indicates that the results from the re-analysis are remarkably comparable to those of the initial analysis.

Duplicate Sample Analysis

One soil sample was analyzed in duplicate with a difference of 6.8%RPD, a value less than the DV QC limit of 35%RPD, thereby demonstrating excellent analytical precision.

Laboratory Control Sample (LCS) Analysis

The LCS recoveries were acceptable and within QC limits of 80-120%, with recoveries of ranging from 94.8% and 111.2%, thereby demonstrating acceptable analytical system performance.

Sample Result Verification

The detected hexavalent chromium concentration for Sample ED008 5-5.5 (JB54625-14R) was listed as 69.5 mg/Kg on the reporting form and 0.2913 mg/L on the quantitation report in the raw data for a 5-fold dilution analysis. A calculation check provides the following result:

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{A \times B \times E}{C \times D}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = \frac{0.2913 \text{ mg/L} \times 0.1 \text{ L} \times 5}{0.00244 \text{ Kg} \times 85.9/100} = \frac{0.14565}{0.002096} = 69.4908 \text{ mg/Kg}$$

$$\text{Cr}^{+6} \text{ (mg/Kg)} = 69.5 \text{ mg/Kg}$$

After rounding to 3 significant figures, this verifies that the hexavalent chromium concentration of 69.5 mg/Kg for Sample ED008 5-5.5 was correctly reported.

SDG JB546235RT

The reducing conditions in the soil matrix appear supported by the TOC, S⁻ screen and Fe⁺² data. The associated QC results for the blank spike, duplicate analysis and the MS results were all within the specified QC limits demonstrating acceptable accuracy and precision.

The supporting analyses (ferrous iron, sulfide screen, and TOC) were analyzed on Sample JB54625-1RT (ED015 0"-6"), a sample which was analyzed twice without detecting a concentration of Cr+6 above 1.0 mg/Kg. The three supporting parameters were analyzed outside the respective holding times in order to provide more information about the possible impact of the sample matrix on the Cr+6 recoveries. Professional judgement was applied in not qualifying these results for the holding time exceedances. According to the method, these analyses should be performed on the sample experiencing the low spike recoveries; the soluble MS recoveries for this QC sample were 72.1% and 63.6% for the reanalysis (JB54625-1R).

The detected ferrous iron (1.4%) and TOC concentration (215,000 mg/Kg) results in JB54625-1RT are at comparable levels with samples in the research literature identified as exhibiting "reducing" soil conditions (Brose and James, 2013; Jardine, et al., 1999; Jardine, et al., 2013), as also indicated on the Eh-pH phase diagram. Thus, the results of the supplemental analyses support the soil conditions being of a "reducing" environment. The "reducing" conditions in the soil matrix of a soil sample falling below the Eh-pH phase line are thereby supported by the TOC, Fe⁺² and Eh-pH data.

Summary for Hexavalent Chromium Analysis

The soil sample results from the initial analysis are presented alongside those obtained from the reanalysis of samples in SDG JB54625 below in Table 6. The Cr+6 results of the reanalysis appear to be comparable to those of the initial analysis, both associated with low MS recoveries and possibly suggesting a potential low bias in the ability to recover this analyte in the given sample matrix.

Table 6. Comparison of Qualified Sample Cr⁺⁶ Results in SDGs JB54625 and JB54625R

Client ID	Lab Sample ID	Analyte	JB54625 Result (mg/Kg)	DV Qualifier	JB54625R Result (mg/Kg)	DV Qualifier
ED015 0"-6"	JB54625-1	Cr+6	1.0	NJ-	0.85	NJ-
ED015 2-2.5	JB54625-2	Cr+6	3.6	NJ-	1.5	NJ-
ED015 8-8.5	JB54625-3	Cr+6	21.7	NJ-	18.2	NJ-
ED013 8-8.5	JB54625-4	Cr+6	< 0.61	NJ-	< 0.61	NJ-
ED013 10-10.5	JB54625-5	Cr+6	< 0.66	NJ-	< 0.66	NJ-
ED013 14-14.5	JB54625-6	Cr+6	< 0.69	NJ-	1.2	NJ-
GD011 0.5-1	JB54625-7	Cr+6	0.78	NJ-	2.2	NJ-
GD011 2-2.5	JB54625-8	Cr+6	1.6	NJ-	< 0.47	NJ-
GD011 4-4.5	JB54625-9	Cr+6	8.1	NJ-	10.6	NJ-
GD011 6-6.5	JB54625-10	Cr+6	0.77	NJ-	0.70	NJ-
ED010 4-4.5	JB54625-11	Cr+6	43.4	NJ-	22.6	NJ-
ED010 5-5.5	JB54625-12	Cr+6	29.5	NJ-	38.0	NJ-
ED010 7-7.5	JB54625-13	Cr+6	28.9	NJ-	19.6	NJ-
ED008 5-5.5	JB54625-14	Cr+6	38.9	NJ-	69.5	NJ-
ED008 6-6.5	JB54625-15	Cr+6	1.1	NJ-	1.9	NJ-
ED008 7-7.5	JB54625-16	Cr+6	1.5	NJ-	0.56	NJ-
ED008 8-8.5	JB54625-17	Cr+6	75.1	NJ-	24.9	NJ-
< – The analyte was analyzed for, but not detected at the specified reporting limit. NJ- – Indicates an estimated value associated with a matrix spike sample recovery that is below QC limits; potential low bias.						

Review of Table 6 indicates that the Cr+6 results from both the initial and the re-analysis are, again, remarkably comparable, even considering the potential for disparities attributable to soil sample non-homogeneity.

3.0 DATA QUALIFIER DEFINITIONS

The absence of qualifiers indicates that the data are acceptable both qualitatively and quantitatively.

Qualifier	Definition
J	The reported result is an estimated value.
<	The compound was analyzed, but was not detected at the stated reporting limit.
N	The matrix spike sample recovery in the associated QC sample is not within QC limits.
NJ+	The matrix spike sample recovery in the associated QC sample is above QC limits; the result may be biased high.
NJ-	The matrix spike sample recovery in the associated QC sample is below QC limits; the result may be biased low.
*	Duplicate analysis not within control limits; indeterminate bias direction.
EJ	The reported value is estimated because of the presence of interference.

4.0 References

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- US EPA, 1992, ***Guidance for Data Usability in Risk Assessment (Part A) Final***, Office of Solid Waste and Emergency Response (OSWER), April 1992.

ATTACHMENT A
Data Validation Checklist

DATA QUALITY ASSURANCE/QUALITY CONTROL CHECKLIST

Project PPG SDG JB 54625

- 1. Were the appropriate sample preservation requirements met?..... Yes No
- 2. Were appropriate sample holding times
(for both extraction/sample preparation and analysis) met? Yes No
If "No", provide a brief explanation.

- 3. Were the samples diluted? Yes No
Indicate the identity of the samples and why.

JB 54625-17 was diluted by 2x for the analysis of Cr⁺⁶ because the concentration was greater than the calibration range.

- 4. If applicable, did sample dilutions result in elevated reporting limits that exceed applicable standards?..... Yes No
If "Yes", list the affected samples.

- 5. Were any applicable standards exceeded for any samples? Yes No
If "Yes", include the number of samples and laboratory sample ID numbers.

Twelve nickel : JB 54625- 2, 3, 4, 5, 6, 9, 10, 13, 14, 15, 16, 17.

Three vanadium : JB 54625- 3, 6, 9.

Five Cr⁺⁶ : JB 54625- 3, 11, 13, 14, 17.

- 6. Were the laboratory reporting limits below the applicable remediation standards/criteria required for the site?..... Yes No
If "No", provide a brief explanation of action taken.

- 7. Were qualifications noted in the non-conformance summary?..... Yes No
Provide a brief explanation.

Refer to DV report discussions of case narrative regarding QC limit exceedances.

No analytical procedural problems were noted.

- 8. Were qualified data used?..... Yes No
- 9. Were rejections noted in the non-conformance summary?..... Yes No
Provide a brief explanation. NA
- 10. Were rejected data used?..... Yes No
If "yes", please indicate reasons rejected data were used:
 - For Hex Chrome, data were rejected because spike recovery was <50%.
 - Data were rejected due to missing deliverables.
 - Data were rejected but an applicable standard exceedance exists.
 - Data were rejected in an early phase of remediation; however, additional sampling and analysis are scheduled to be performed.
 - Other reasons not noted directly above. Explain:

- 11. Were the quality control criteria associated with the compounds of concern at the site met? Yes No
- 12. Were the QC Summary Forms reviewed?..... Yes No
- 13. Internal Standards acceptable..... Yes No
- 14. MS/MSD acceptable..... Yes No
- 15. Calibration summaries acceptable..... Yes No
- 16. Serial dilutions acceptable..... Yes No
- 17. Inorganic duplicates acceptable..... Yes No
- 18. LCS recovery acceptable..... Yes No
- 19. Other QC acceptable?..... Yes No
Provide a brief explanation, if applicable.

Refer to DV report tables 2, 4 and 5 for details.

Qualified sample results are presented in tables 3 and 6 of the DV report.

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC68303

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30412R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC68303 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180619)	JC68303-1	Water	6/19/2018		X	X	X
SW-D10(0.0-0.5)	JC68303-2	Soil	6/19/2018		X	X	X
SW-D10(2.0-2.5)	JC68303-3	Soil	6/19/2018		X	X	X
SW-D10(4.0-4.5)	JC68303-4	Soil	6/19/2018		X	X	X
SW-D10(6.0-6.5)	JC68303-5	Soil	6/19/2018		X	X	X
SW-D10(8.0-8.5)	JC68303-6	Soil	6/19/2018		X	X	X
SW-D10(10.0-10.5)	JC68303-7	Soil	6/19/2018		X	X	X
DUP-1(20180619)	JC68303-8	Soil	6/19/2018	SW-D10(4.0-4.5)	X	X	X
SW-D9(0.0-0.5)	JC68303-9	Soil	6/19/2018		X	X	X
SW-D9(2.0-2.5)	JC68303-10	Soil	6/19/2018		X	X	X
SW-D9(4.0-4.5)	JC68303-11	Soil	6/19/2018		X	X	X
SW-D9(6.0-6.5)	JC68303-12	Soil	6/19/2018		X	X	X
SW-D9(8.0-8.5)	JC68303-13	Soil	6/19/2018		X	X	X
SW-D9(10.0-10.5)	JC68303-14	Soil	6/19/2018		X	X	X
SW-D4(0.0-0.5)	JC68303-15	Soil	6/19/2018		X	X	X
SW-D4(2.0-2.5)	JC68303-16	Soil	6/19/2018		X	X	X
SW-D4(4.0-4.5)	JC68303-17	Soil	6/19/2018		X	X	X
SW-D4(6.0-6.5)	JC68303-18	Soil	6/19/2018		X	X	X
SW-D4(8.0-8.5)	JC68303-19	Soil	6/19/2018		X	X	X
SW-D4(10.0-10.5)	JC68303-20	Soil	6/19/2018		X	X	X
DUP-2(20180619)	JC68303-21	Soil	6/19/2018	SW-D4(0.0-0.5)	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130%.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample locations SW-D10(4.0-4.5) and SW-D9(2.0-2.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D10(4.0-4.5)	Antimony	56.4%	58.4%
SW-D9(2.0-2.5)	Antimony	56.4%	58.4%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-D10(4.0-4.5) and SW-D9(2.0-2.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D10(4.0-4.5) / DUP-1(20180619)	Chromium	18.4	21 U	AC
	Vanadium	24.0	25.1	
	Nickel	12.8	26.8	NC
SW-D4(0.0-0.5) / DUP-2(20180619)	Nickel	19.8	19.9	AC
	Chromium	17.1	13.7	22.1%
	Vanadium	43.4	41.6	4.2%

Notes:

AC = Acceptable

NC = Non-compliant

The nickel results associated with samples locations SW-D10(4.0-4.5) and DUP-1(20180619) were not in agreement. The associated sample results were qualified as estimated.

The differences in the results between the parent sample SW-D4(0.0-0.5) and field duplicate sample DUP-2(20180619) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample locations SW-D10(4.0-4.5) and SW-D9(2.0-2.5) exhibited %D within control limits, with the exception of the analytes presented in the following table.

DATA REVIEW REPORT

Sample Locations	Analytes	Serial Dilution (%D)
SW-D10(4.0-4.5)	Chromium	13.5%
SW-D9(2.0-2.5)	Chromium	11.5%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

The chromium and thallium results in sample DUP-1(20180619) were reported as non-detected at an elevated reporting limit of 21mg/kg. The sample required dilution due to an interfering element.

The thallium result in sample SW-D4(6.0-6.5) was reported as non-detected at an elevated reporting limit of 11mg/kg. The sample required dilution due to an interfering element.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards					X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-D10(4.0-4.5) in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D10(4.0-4.5)	Hexavalent Chromium, Soluble	67.1%	64.2%
SW-D9(2.0-2.5)	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	59.2%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-D10(4.0-4.5) exhibited a recovery within the control limits.

Spike recoveries were outside of the control limits as presented in the table below.

DATA REVIEW REPORT

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
SW-D9(2.0-2.5)	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-D10(4.0-4.5) and SW-D9(2.0-2.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D10(4.0-4.5) / DUP-1(20180619)	Hexavalent Chromium	1.1	0.45 U	AC
SW-D4(0.0-0.5) / DUP-2(20180619)	Hexavalent Chromium	0.56	0.46	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-D10(4.0-4.5) and field duplicate sample DUP-1(20180619) were acceptable.

DATA REVIEW REPORT

The differences in the results between the parent sample SW-D4(0.0-0.5) and field duplicate sample DUP-2(20180619) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample locations SW-D10(4.0-4.5) and SW-D9(2.0-2.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D10(4.0-4.5) / DUP-1(20180619)	Redox Potential	340	286	17.3%
	pH	8.05	8.23	2.2%
SW-D4(0.0-0.5) / DUP-2(20180619)	Redox Potential	315	284	10.4%
	pH	8.75	8.22	6.2%

The differences in the results between the parent sample SW-D10(4.0-4.5) and field duplicate sample DUP-1(20180619) were acceptable.

The differences in the results between the parent sample SW-D4(0.0-0.5) and field duplicate sample DUP-2(20180619) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: August 28, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



FED-EX Tracking #
SGS Order # **LS-06818-138**
SGS Quote # **JC68303**

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)												Matrix Codes	
Company Name: Atceadis Street Address: 10 Friends Lane Suite 200 City: Newton PA 18440 Project Contact: Krista Mastroleca Phone #: 610.355.7080 Sample(s) Name(s): Cheska C. Fall		Project Name: PPG Jersey City Site 107 Street: 18 Chapel Ave. City: Jersey City N.J. Project #: NP000770.0001.00005 Client Purchase Order #: Project Manager: Sim Malashlija		Billing Information (if different from Report to) Company Name: Street Address: City: State: Zip:												LVE - Drinking water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LOI - Other Liquor AIR - Air SOL - Other Solids WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	NI	NI03	NI04	NI05	NI06	NI07	NI08	NI09	NI10	LAB USE ONLY
1	FB(20180619)		6/19/18	0615	CC	FB	2										C34
2	SW-D10(0.0-0.5)		6/19/18	0930	CC	SO	1										M10
3	SW-D10(2.0-2.5)		6/19/18	0945	CC	SO	1										A38
4	SW-D10(4.0-4.5)		6/19/18	0955	CC	SO	1										
5	SW-D10(6.0-6.5)		6/19/18	1005	CC	SO	1										
6	SW-D10(8.0-8.5)		6/19/18	1015	CC	SO	1										
7	SW-D10(10.0-10.5)		6/19/18	1025	CC	SO	1										
4	SW-D10(4.0-4.5)MS		6/19/18	0955	CC	SO	1										
	SW-D10(4.0-4.5)MSD		6/19/18	0955	CC	SO	1										
8	DUP-1(20180619)		6/19/18	-	-	SO	1										
9	SW-D9(0.0-0.5)		6/19/18	1050	CC	SO	1										
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date: _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 344) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input type="checkbox"/> EDD Format <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other _____ NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only Commercial "B" = Results + QC Summary												INITIAL ASSESSMENT SA Sam LABEL VERIFICATION _____	
<input type="checkbox"/> Emergency & Rush T/A data available via LabLink		Data Deliverable Information Comments / Special Instructions:												Sample inventory is verified upon receipt in the Laboratory			
Sample Custody events documented below each time samples change possession, including courier delivery.																	
Relinquished by Sampler:	Date/Time:	Received By:	Relinquished by:	Date/Time:	Received By:	Relinquished by:	Date/Time:	Received By:	Relinquished by:	Date/Time:	Received By:	Relinquished by:	Date/Time:	Received By:	Relinquished by:	Date/Time:	Received By:
1	6/19/18 1350	1	2	6-19-18 1725	3	4											
3		5															
5																	

5.2 5

034 SA



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusu

FED-EX Tracking #
SGS Quote #
SGS Order Count #
SGS Job # JC68303

Client / Reporting Information, Project Information, Requested Analysis (see TEST CODE sheet), Matrix Codes, Lab Sample #, Field ID / Point of Collection, MEON/DI Vial #, Date, Time, Sampled by, Matrix, # of bottles, Data Deliverable Information, Approved by (SGS Project Manager)/Date, Relinquished by, Date Time, Received By, Date Time, Custody Seal #, Preserved where applicable, Cooler Temp.

5.2 5



Report of Analysis

Client Sample ID: FB(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-1	Date Received: 06/19/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/19/18 21:05	LS	SW846 7196A
Redox Potential Vs H2	533		mv	1	06/20/18 09:48	RI	ASTM D1498-76
pH ^a	5.38		su	1	06/19/18 17:44	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-2	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.43	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	375		mv	1	06/20/18 11:53	RI	ASTM D1498-76M
Solids, Percent	93.7		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.39		su	1	06/20/18 11:53	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-3	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.45	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	345		mv	1	06/20/18 12:06	RI	ASTM D1498-76M
Solids, Percent	88.2		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	7.97		su	1	06/20/18 12:06	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-4	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.44	mg/kg	1	06/21/18 12:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	06/20/18 11:50	RI	ASTM D1498-76M
Solids, Percent	90.1		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.05		su	1	06/20/18 11:29	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-5	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	307		mv	1	06/20/18 12:08	RI	ASTM D1498-76M
Solids, Percent	87.9		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.12		su	1	06/20/18 12:08	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-6	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	06/20/18 12:15	RI	ASTM D1498-76M
Solids, Percent	85.5		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.11		su	1	06/20/18 12:15	RI	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D10(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-7	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	06/20/18 12:24	RI	ASTM D1498-76M
Solids, Percent	80.5		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	7.99		su	1	06/20/18 12:23	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-1(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-8	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	286		mv	1	06/20/18 12:30	RI	ASTM D1498-76M
Solids, Percent	89.5		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.23		su	1	06/20/18 12:30	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D9(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-9	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 95.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	06/21/18 12:32	DC	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	06/20/18 12:33	RI	ASTM D1498-76M
Solids, Percent	95.5		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.36		su	1	06/20/18 12:33	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-10	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.46	mg/kg	1	06/21/18 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	339		mv	1	06/20/18 13:32	RI	ASTM D1498-76M
Solids, Percent	87.8		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	7.86		su	1	06/20/18 13:09	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-11	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	334		mv	1	06/20/18 13:36	RI	ASTM D1498-76M
Solids, Percent	85.2		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.09		su	1	06/20/18 13:13	RI	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D9(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-12	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	327		mv	1	06/20/18 13:39	RI	ASTM D1498-76M
Solids, Percent	85.6		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.23		su	1	06/20/18 13:24	RI	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D9(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-13	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	06/20/18 13:42	RI	ASTM D1498-76M
Solids, Percent	83.5		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.38		su	1	06/20/18 13:32	RI	SW846 9045D

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: SW-D9(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-14	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	06/20/18 13:45	RI	ASTM D1498-76M
Solids, Percent	83.4		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.30		su	1	06/20/18 13:45	RI	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-15	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56 J-	0.42	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	06/20/18 13:54	RI	ASTM D1498-76M
Solids, Percent	96		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.75		su	1	06/20/18 13:54	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-16	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 89.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.45	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	332		mv	1	06/20/18 13:57	RI	ASTM D1498-76M
Solids, Percent	89.3		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.13		su	1	06/20/18 13:57	RI	SW846 9045D

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-17	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	328		mv	1	06/20/18 14:00	RI	ASTM D1498-76M
Solids, Percent	85.8		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.14		su	1	06/20/18 14:00	RI	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-18	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	334		mv	1	06/20/18 14:03	RI	ASTM D1498-76M
Solids, Percent	87.7		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.08		su	1	06/20/18 14:03	RI	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-19	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	06/20/18 14:16	RI	ASTM D1498-76M
Solids, Percent	85.3		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.07		su	1	06/20/18 14:16	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-20	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	06/21/18 14:27	DC	SW846 3060A/7196A
Redox Potential Vs H2	252		mv	1	06/20/18 14:23	RI	ASTM D1498-76M
Solids, Percent	79.8		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.09		su	1	06/20/18 14:23	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-2(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-21	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.46 J-	0.43	mg/kg	1	06/21/18 14:30	DC	SW846 3060A/7196A
Redox Potential Vs H2	284		mv	1	06/20/18 14:30	RI	ASTM D1498-76M
Solids, Percent	93.4		%	1	06/20/18 13:20	BG	SM2540 G 18TH ED MOD
pH	8.22		su	1	06/20/18 14:29	RI	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: FB(20180619)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-1A		Date Received: 06/19/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7737

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180619)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-1A		Date Received: 06/19/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/20/18 16:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5) Lab Sample ID: JC68303A-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 93.7
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	17.0 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	25.0	4.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	49.3	5.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-2A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.8	1.5	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5) Lab Sample ID: JC68303A-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 88.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	22.7 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	20.3	4.4	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	83.8	5.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-3A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.6	1.6	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-4A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	18.4 J	1.1	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	12.8 J	4.5	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	24.0	5.6	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-4A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.3	1.5	mg/kg	1	06/21/18 12:25	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5) Lab Sample ID: JC68303A-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 87.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	15.4 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	18.5	4.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.1	5.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-5A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4	1.6	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-6A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	17.2 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	36.5	4.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	18.5	5.7	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D10(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-6A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.2	1.6	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(10.0-10.5) Lab Sample ID: JC68303A-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 80.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	19.0 J	1.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	31.9	5.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.7	6.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D10(10.0-10.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-7A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.0	1.8	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-1(20180619) Lab Sample ID: JC68303A-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 89.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium ^a	< 21 UJ	21	mg/kg	20	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	26.8 J	4.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium ^a	< 21	21	mg/kg	20	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	25.1	5.4	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-1(20180619)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-8A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 21	21	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D9(0.0-0.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-9A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 95.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	20.4 J	1.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	23.6	4.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	51.0	5.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-9A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 95.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.0	1.4	mg/kg	1	06/21/18 12:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-10A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	40.4 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	16.5	4.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	32.3	5.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7736

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-10A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	38.6	1.6	mg/kg	1	06/21/18 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(4.0-4.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-11A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	24.3 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	20.6	4.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	26.4	5.7	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D9(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-11A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.2	1.6	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(6.0-6.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-12A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	20.8 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	54.5	4.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.6	5.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D9(6.0-6.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-12A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.8	1.6	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-13A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	19.3 J	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	42.9	4.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.0	5.8	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-13A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.3	1.7	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(10.0-10.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-14A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	21.7 J	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	35.6	4.7	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.7	5.9	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D9(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-14A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.7	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5) Lab Sample ID: JC68303A-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 96.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	17.1 J	1.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	19.8	4.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	43.4	5.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-15A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.5	1.4	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5) Lab Sample ID: JC68303A-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 89.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	44.3 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	18.4	4.4	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	30.6	5.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-16A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 89.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	42.9	1.6	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5) Lab Sample ID: JC68303A-17A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 85.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	15.3 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	15.4	4.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.3	5.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-17A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.2	1.6	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-18A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	2.9 J-	2.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium ^a	73.0 J	1.1	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel ^a	124	4.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium ^a	< 11	11	mg/kg	10	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium ^a	44.3	5.4	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-18A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	73.0	1.6	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)		Date Sampled: 06/19/18
Lab Sample ID: JC68303A-19A		Date Received: 06/19/18
Matrix: SO - Soil		Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	17.7 J	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	31.4	4.6	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	20.0	5.8	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-19A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.7	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5) Lab Sample ID: JC68303A-20A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 79.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	25.3 J	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	64.0	5.0	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.2	6.2	mg/kg	1	06/20/18	06/20/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-20A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.3	1.7	mg/kg	1	06/21/18 14:27	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-2(20180619) Lab Sample ID: JC68303A-21A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/18 Date Received: 06/19/18 Percent Solids: 93.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	13.7 J	1.0	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	19.9	4.2	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	41.6	5.2	mg/kg	1	06/20/18	06/20/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44683

(2) Prep QC Batch: MP7735

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: DUP-2(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303A-21A	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	1.4	mg/kg	1	06/21/18 14:30	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-2R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-3R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-4R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	06/25/18 11:58	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-5R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-6R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-7R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-1(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-8R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D9(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-9R	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 95.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42	0.42	mg/kg	1	06/25/18 12:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-10T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98	0.46	mg/kg	1	06/23/18 15:33	RP	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D9(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-11T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.47	mg/kg	1	06/23/18 15:33	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-12T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-13T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D9(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-14T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-15T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61	0.42	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-16T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 89.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.97	0.45	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-17T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-18T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.46	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-19T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-20T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/23/18 16:23	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-2(20180619)	Date Sampled: 06/19/18
Lab Sample ID: JC68303-21T	Date Received: 06/19/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79	0.43	mg/kg	1	06/23/18 16:23	RP	SW846-3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC68561

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30413R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC68561 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180622)	JC68561-1	Water	6/22/2018		X	X	X
SW-D8(0.0-0.5)	JC68561-2	Soil	6/22/2018		X	X	X
SW-D8(2.0-2.5)	JC68561-3	Soil	6/22/2018		X	X	X
SW-D8(4.0-4.5)	JC68561-4	Soil	6/22/2018		X	X	X
SW-D8(6.0-6.5)	JC68561-5	Soil	6/22/2018		X	X	X
SW-D8(8.0-8.5)	JC68561-6	Soil	6/22/2018		X	X	X
SW-D7(0.0-0.5)	JC68561-7	Soil	6/22/2018		X	X	X
SW-D7(2.0-2.5)	JC68561-8	Soil	6/22/2018		X	X	X
SW-D7(4.0-4.5)	JC68561-9	Soil	6/22/2018		X	X	X
SW-D7(6.0-6.5)	JC68561-10	Soil	6/22/2018		X	X	X
SW-D7(8.0-8.5)	JC68561-11	Soil	6/22/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. The metals analysis for sample SW-D7(8.0-8.5) also included synthetic precipitation leachate procedure (SPLP) nickel.
3. Cr VI is hexavalent chromium.
4. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	SPLP Leachate	180 days from collection to analysis	Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All low-level calibration verification standard recoveries were within control limits of 70% to 130%.

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS/LCSD analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample

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are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-D8(2.0-2.5) and SW-D7(8.0-8.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D8(2.0-2.5)	Hexavalent Chromium, Soluble	< 50%	< 50%
SW-D7(8.0-8.5)	Hexavalent Chromium, Soluble	< 50%	Not reanalyzed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-D8(2.0-2.5) exhibited a recovery within the control limits.

Spike recoveries were outside of the control limits as presented in the table below.

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Sample Location	Analyte	PDS Recovery
SW-D7(8.0-8.5)	Hexavalent Chromium	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-D8(2.0-2.5) and SW-D7(8.0-8.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-D8(0.0-0.5) SW-D8(2.0-2.5) SW-D8(4.0-4.5) SW-D8(6.0-6.5) SW-D8(8.0-8.5) SW-D7(0.0-0.5) SW-D7(2.0-2.5) SW-D7(4.0-4.5) SW-D7(6.0-6.5)	SW846 9045D	Analysis: 6 days	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

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A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location FB(20180622) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: August 28, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





CHAIN OF CUSTODY

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FEL/EX Tracking #
Bothe/Spec Control #
SGS Quote #
SGS Order # JC68561

Client / Reporting Information, Project Information, Requested Analysis (see TEST CODE sheet), Matrix Codes, Lab Sample #, Field ID / Point of Collection, MEQ/DI Vial #, Date, Time, Sampled by, Matrix, # of bottles, Analysis columns (As, Pb, Cd, etc.), Turnaround Time, Approved by (SGS Project Manager)/Date, Commercial "A" (Level 1), Commercial "B" (Level 2), FULLT1 (Level 3+4), NJ Reduced, Commercial "C", NYASP Category A, NYASP Category B, State Forms, EDD Format, Other, Emergency & Rush T/A data available via LabLink, Sample Custody must be documented below each time samples change possession, including courier delivery.

5.2
5

3.4



Report of Analysis

Client Sample ID: FB(20180622)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-1		Date Received: 06/22/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/22/18 21:16	LS	SW846 7196A
Redox Potential Vs H2	496		mv	1	06/25/18 12:46	RB	ASTM D1498-76
pH ^a	5.37		su	1	06/22/18 15:30	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D8(0.0-0.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-2R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 91.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.44	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	373		mv	1	06/28/18 11:12	AC	ASTM D1498-76M
pH	8.08 J		su	1	06/28/18 10:54	AC	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D8(2.0-2.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-3R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85 J-	0.46	mg/kg	1	06/28/18 13:19	DC	SW846 3060A/7196A
Redox Potential Vs H2	346		mv	1	06/28/18 11:17	AC	ASTM D1498-76M
pH	7.65 J		su	1	06/28/18 11:00	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D8(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-4R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.46	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	351		mv	1	06/28/18 11:23	AC	ASTM D1498-76M
pH	7.81 J		su	1	06/28/18 11:06	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8(6.0-6.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-5R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	333		mv	1	06/28/18 11:28	AC	ASTM D1498-76M
pH	8.15 J		su	1	06/28/18 11:12	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-6R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	331		mv	1	06/28/18 11:33	AC	ASTM D1498-76M
pH	8.04 J		su	1	06/28/18 11:17	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(0.0-0.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-7R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.44 J-	0.40	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	329		mv	1	06/28/18 11:39	AC	ASTM D1498-76M
pH	8.43 J		su	1	06/28/18 11:21	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(2.0-2.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-8R		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64 J-	0.46	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	06/28/18 11:46	AC	ASTM D1498-76M
pH	7.62 J		su	1	06/28/18 11:26	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D7(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-9R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	333		mv	1	06/28/18 11:51	AC	ASTM D1498-76M
pH	7.89 J		su	1	06/28/18 11:32	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(6.0-6.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-10R	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	06/28/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	06/28/18 11:56	AC	ASTM D1498-76M
pH	8.06 J		su	1	06/28/18 11:37	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(8.0-8.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-11		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	06/26/18 13:21	RI	SW846 3060A/7196A
Redox Potential Vs H2	260		mv	1	06/23/18 11:34	AC	ASTM D1498-76M
Solids, Percent	80.1		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD
pH	7.41		su	1	06/23/18 11:34	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180622)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-1A	Date Received: 06/22/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/23/18	06/24/18 GT	SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/23/18	06/24/18 GT	SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/23/18	06/24/18 GT	SW846 6010C ¹	SW846 3010A ²
Thallium	< 2.0	2.0	ug/l	1	06/23/18	06/24/18 GT	SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/23/18	06/24/18 GT	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44705

(2) Prep QC Batch: MP7795

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180622)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-1A	Date Received: 06/22/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/24/18 17:40	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(0.0-0.5) Lab Sample ID: JC68561-2 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 91.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/23/18	06/25/18	ND	SW846 6010C ¹ SW846 3050B ²
Chromium	29.2	1.1	mg/kg	1	06/23/18	06/25/18	ND	SW846 6010C ¹ SW846 3050B ²
Nickel	38.1	4.3	mg/kg	1	06/23/18	06/25/18	ND	SW846 6010C ¹ SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18	ND	SW846 6010C ¹ SW846 3050B ²
Vanadium	60.4	5.4	mg/kg	1	06/23/18	06/25/18	ND	SW846 6010C ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D8(0.0-0.5) Lab Sample ID: JC68561-2 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 91.6
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.0	1.5	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	91.6		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D8(2.0-2.5) Lab Sample ID: JC68561-3 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 87.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	16.4	1.1	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	14.8	4.4	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	19.8	5.4	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8(2.0-2.5) Lab Sample ID: JC68561-3 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 87.4
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	1.6	mg/kg	1	06/28/18 13:19	DC	SW846 6010/7196A M
Solids, Percent	87.4		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-4	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	121	1.1	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	52.1	4.6	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	41.6	5.7	mg/kg	1	06/23/18	06/25/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8(4.0-4.5) Lab Sample ID: JC68561-4 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 87.7
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	120	1.6	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	87.7		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8(6.0-6.5) Lab Sample ID: JC68561-5 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 85.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	23.8	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	92.1	4.7	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.9	5.8	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D8(6.0-6.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-5		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.8	1.7	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	85.6		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-6	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	20.7	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	43.5	4.6	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.0	5.7	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(8.0-8.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-6		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.7	1.6	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	84		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(0.0-0.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-7	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0	2.0	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	18.1	0.98	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	24.7	3.9	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 0.98	0.98	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	48.9	4.9	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D7(0.0-0.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-7		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.4	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	99.1		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D7(2.0-2.5) Lab Sample ID: JC68561-8 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 86.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	28.9	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	30.2	4.5	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	32.3	5.6	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D7(2.0-2.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-8		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.3	1.6	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	86.3		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(4.0-4.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-9		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	28.6	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	20.3	4.7	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	31.6	5.9	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-9	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.1	1.7	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	84.1		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(6.0-6.5) Lab Sample ID: JC68561-10 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/22/18 Date Received: 06/22/18 Percent Solids: 88.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	22.1	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	55.5	4.5	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	23.5	5.6	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-D7(6.0-6.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-10	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.1	1.6	mg/kg	1	06/28/18 13:25	DC	SW846 6010/7196A M
Solids, Percent	88.1		%	1	06/25/18 10:30	BG	SM2540 G 18TH ED MOD

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-11A	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	22.3	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	321	4.8	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	24.6	6.1	mg/kg	1	06/23/18	06/25/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44710

(2) Prep QC Batch: MP7799

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-11A	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.3	1.7	mg/kg	1	06/26/18 13:21	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(8.0-8.5)		Date Sampled: 06/22/18
Lab Sample ID: JC68561-11AT		Date Received: 06/22/18
Matrix: SO - Soil		Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	20.3		10	ug/l	1	07/10/18	07/11/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44821

(2) Prep QC Batch: MP7953

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

4.1
4

Report of Analysis

Client Sample ID: SW-D7(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-11AT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	9.39		su	1	07/10/18 09:11	BM	SW846 1312
Volume, SPLP Leachate	2.007		l	1	07/10/18 09:11	BM	SW846 1312
Weight, SPLP Leachate	0.1003		kg	1	07/10/18 09:11	BM	SW846 1312
Dry Weight, SPLP Leachate	0.08036		kg	1	07/10/18 09:11	BM	SW846 1312

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D8(0.0-0.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-2RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 91.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(2.0-2.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-3RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	07/03/18 11:40	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-4RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58	0.46	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8(6.0-6.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-5RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(8.0-8.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-6RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(0.0-0.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-7RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.40	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(2.0-2.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-8RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50	0.46	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(4.0-4.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-9RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.72	0.48	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7(6.0-6.5)	Date Sampled: 06/22/18
Lab Sample ID: JC68561-10RT	Date Received: 06/22/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	07/03/18 11:46	DC	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC68675

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30414R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC68675 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180625)	JC68675-1	Water	6/25/2018		X	X	X
BS-E29	JC68675-2	Soil	6/25/2018		X	X	X
SW-D9(12.0-12.5)	JC68675-3	Soil	6/25/2018		X	X	X
SW-D4(12.0-12.5)	JC68675-4	Soil	6/25/2018		X	X	X
SW-D4(14.0-14.5)	JC68675-5	Soil	6/25/2018		X	X	X
SW-D8(10.0-10.5)	JC68675-6	Soil	6/25/2018		X	X	X
SW-D8(12.0-12.5)	JC68675-7	Soil	6/25/2018		X	X	X
SW-D10(12.0-12.5)	JC68675-8	Soil	6/25/2018		X	X	X
SW-D3(0.0-0.5)	JC68675-9	Soil	6/25/2018		X	X	X
SW-D3(2.0-2.5)	JC68675-10	Soil	6/25/2018		X	X	X
SW-D3(4.0-4.5)	JC68675-11	Soil	6/25/2018		X	X	X
SW-D3(6.0-6.5)	JC68675-12	Soil	6/25/2018		X	X	X
SW-D3(8.0-8.5)	JC68675-13	Soil	6/25/2018		X	X	X
SW-D3(10.0-10.5)	JC68675-14	Soil	6/25/2018		X	X	X
SW-D3(12.0-12.5)	JC68675-15	Soil	6/25/2018		X	X	X
SW-D3(14.0-14.5)	JC68675-16	Soil	6/25/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. The metals analysis for samples SW-D8(10.0-10.5) and SW-D3(6.0-6.5) also included synthetic precipitation leachate procedure (SPLP) nickel.
3. Cr VI is hexavalent chromium.
4. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	SPLP Leachate	180 days from collection to analysis	Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All low-level calibration verification standard recoveries were within control limits of 70% to 130%.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-E29	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	69.8%	57.9%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

Spike recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
BS-E29	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

DATA REVIEW REPORT

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location BS-E29 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample location BS-E29 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: August 28, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB(20180625)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-1	Date Received: 06/25/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/25/18 20:50	LS	SW846 7196A
Redox Potential Vs H2	531		mv	1	06/26/18 10:04	RB	ASTM D1498-76
pH ^a	5.61		su	1	06/25/18 17:25	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E29	Date Sampled: 06/25/18
Lab Sample ID: JC68675-2	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	06/26/18 15:37	RI	SW846 3060A/7196A
Redox Potential Vs H2	179		mv	1	06/26/18 11:22	RB	ASTM D1498-76M
Solids, Percent	75.6		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	6.73		su	1	06/26/18 11:02	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D9(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-3	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	06/26/18 15:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	261		mv	1	06/26/18 11:28	RB	ASTM D1498-76M
Solids, Percent	72.4		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.65		su	1	06/26/18 11:14	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D4(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-4	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 46.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.86 UJ-	0.86	mg/kg	1	06/26/18 15:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	155		mv	1	06/26/18 11:38	RB	ASTM D1498-76M
Solids, Percent	46.3		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.61		su	1	06/26/18 11:28	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D4(14.0-14.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-5	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 72.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	06/26/18 15:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	123		mv	1	06/26/18 11:44	RB	ASTM D1498-76M
Solids, Percent	72		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	6.93		su	1	06/26/18 11:38	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-6	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84 J-	0.51	mg/kg	1	06/26/18 15:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	06/26/18 11:56	RB	ASTM D1498-76M
Solids, Percent	79		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.68		su	1	06/26/18 11:43	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(12.0-12.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-7		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	300		mv	1	06/26/18 12:03	RB	ASTM D1498-76M
Solids, Percent	74.8		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.35		su	1	06/26/18 11:56	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D10(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-8	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	317		mv	1	06/26/18 12:05	RB	ASTM D1498-76M
Solids, Percent	74.8		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.68		su	1	06/26/18 12:01	RB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-9	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 95.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	06/26/18 12:06	RB	ASTM D1498-76M
Solids, Percent	95.9		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	8.52		su	1	06/26/18 12:05	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-10	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ-	0.43	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	06/26/18 12:11	RB	ASTM D1498-76M
Solids, Percent	92.3		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	8.19		su	1	06/26/18 12:11	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-11	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44 UJ-	0.44	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	304		mv	1	06/26/18 12:21	RB	ASTM D1498-76M
Solids, Percent	91.8		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	6.88		su	1	06/26/18 12:23	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-12		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44 UJ-	0.44	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	284		mv	1	06/26/18 12:23	RB	ASTM D1498-76M
Solids, Percent	91.5		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.62		su	1	06/26/18 12:24	RB	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-13	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	06/26/18 12:26	RB	ASTM D1498-76M
Solids, Percent	85.7		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.98		su	1	06/26/18 12:26	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-14	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.72 J-	0.50	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	226		mv	1	06/26/18 12:34	RB	ASTM D1498-76M
Solids, Percent	80.7		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.90		su	1	06/26/18 12:31	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-15	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 49.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.80 UJ-	0.80	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	264		mv	1	06/26/18 12:36	RB	ASTM D1498-76M
Solids, Percent	49.7		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.08		su	1	06/26/18 12:35	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(14.0-14.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-16	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64 UJ-	0.64	mg/kg	1	06/26/18 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	06/26/18 12:37	RB	ASTM D1498-76M
Solids, Percent	62.5		%	1	06/26/18 11:06	RC	SM2540 G 18TH ED MOD
pH	7.51		su	1	06/26/18 12:37	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180625) Lab Sample ID: JC68675-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3010A ²
Thallium	< 2.0	2.0	ug/l	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44718

(2) Prep QC Batch: MP7826

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180625)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-1A	Date Received: 06/25/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/26/18 19:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E29	Date Sampled: 06/25/18
Lab Sample ID: JC68675-2A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	06/26/18	06/26/18	ND	SW846 6010C ¹ SW846 3050B ²
Chromium	20.3	1.3	mg/kg	1	06/26/18	06/26/18	ND	SW846 6010C ¹ SW846 3050B ²
Nickel	363	5.3	mg/kg	1	06/26/18	06/26/18	ND	SW846 6010C ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/26/18	06/26/18	ND	SW846 6010C ¹ SW846 3050B ²
Vanadium	17.5	6.6	mg/kg	1	06/26/18	06/26/18	ND	SW846 6010C ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E29	Date Sampled: 06/25/18
Lab Sample ID: JC68675-2A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.3	1.8	mg/kg	1	06/26/18 18:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D9(12.0-12.5) Lab Sample ID: JC68675-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 72.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	4.5	1.4	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	71.4	5.7	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	8.3	7.1	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D9(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-3A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	4.5	2.0	mg/kg	1	06/26/18 18:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D4(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-4A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 46.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 4.2	4.2	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Chromium	179	2.1	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Nickel	268	8.3	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Thallium	< 2.1	2.1	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²
Vanadium	70.4	10	mg/kg	1	06/26/18	06/26/18	ND SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D4(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-4A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 46.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	179	3.0	mg/kg	1	06/26/18 18:28	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(14.0-14.5) Lab Sample ID: JC68675-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 72.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	11.0	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	35.8	5.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	65.1	6.7	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D4(14.0-14.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-5A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 72.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.0	1.9	mg/kg	1	06/26/18 18:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5) Lab Sample ID: JC68675-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 79.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	30.7	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	637	5.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	25.5	6.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-6A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.9	1.8	mg/kg	1	06/26/18 18:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D8(12.0-12.5) Lab Sample ID: JC68675-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 74.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	23.3	1.4	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	1160	5.4	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	15.7	6.8	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D8(12.0-12.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-7A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.3	1.9	mg/kg	1	06/26/18 18:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D10(12.0-12.5) Lab Sample ID: JC68675-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 74.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	25.7	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	5190	26	mg/kg	5	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	25.6	6.5	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D10(12.0-12.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-8A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.7	1.8	mg/kg	1	06/26/18 18:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5) Lab Sample ID: JC68675-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 95.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0	2.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	10.9	0.99	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	18.2	4.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 0.99	0.99	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	34.5	5.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-9A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 95.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.9	1.4	mg/kg	1	06/26/18 18:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-10A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	26.6	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	34.6	4.5	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	90.3	5.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-10A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.6	1.5	mg/kg	1	06/26/18 18:53	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-11A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	15.7	1.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	12.6	4.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.8	5.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-11A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.7	1.4	mg/kg	1	06/26/18 21:20	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-12A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	38.7	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	49.7	4.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	25.6	5.3	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-12A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	38.7	1.5	mg/kg	1	06/26/18 18:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-13A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	18.3	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	41.8	4.5	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	19.3	5.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-13A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.13
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.3	1.6	mg/kg	1	06/26/18 19:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-14A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	19.0	1.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	23.7	4.9	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.5	6.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-14A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.3	1.7	mg/kg	1	06/26/18 19:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(12.0-12.5) Lab Sample ID: JC68675-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 49.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.9	3.9	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	201	2.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	77.4	7.9	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 2.0	2.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	76.4	9.9	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-15A	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 49.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	201	2.8	mg/kg	1	06/26/18 19:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(14.0-14.5) Lab Sample ID: JC68675-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/25/18 Date Received: 06/25/18 Percent Solids: 62.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Chromium	12.6	1.5	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Nickel	295	6.1	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	16.0	7.6	mg/kg	1	06/26/18	06/26/18 ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44717

(2) Prep QC Batch: MP7828

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(14.0-14.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-16A		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.6	2.1	mg/kg	1	06/26/18 19:19	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-6AR		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	< 10		10	ug/l	1	07/10/18	07/11/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44821

(2) Prep QC Batch: MP7953

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

4.1
4

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-6AR		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.60		su	1	07/10/18 09:11	BM	SW846 1312
Volume, SPLP Leachate	2.012		l	1	07/10/18 09:11	BM	SW846 1312
Weight, SPLP Leachate	0.1006		kg	1	07/10/18 09:11	BM	SW846 1312
Dry Weight, SPLP Leachate	0.07947		kg	1	07/10/18 09:11	BM	SW846 1312

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-12AR	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	15.0		10	ug/l	1	07/10/18	07/11/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44821

(2) Prep QC Batch: MP7953

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

4.2
4

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)		Date Sampled: 06/25/18
Lab Sample ID: JC68675-12AR		Date Received: 06/25/18
Matrix: SO - Soil		Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.69		su	1	07/10/18 09:11	BM	SW846 1312
Volume, SPLP Leachate	2.005		l	1	07/10/18 09:11	BM	SW846 1312
Weight, SPLP Leachate	0.1003		kg	1	07/10/18 09:11	BM	SW846 1312
Dry Weight, SPLP Leachate	0.09175		kg	1	07/10/18 09:11	BM	SW846 1312

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E29	Date Sampled: 06/25/18
Lab Sample ID: JC68675-2R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	06/27/18 16:48	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D9(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-3R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	06/27/18 16:53	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-4R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 46.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.86	0.86	mg/kg	1	06/27/18 16:53	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(14.0-14.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-5R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 72.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	06/27/18 16:53	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8(10.0-10.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-6R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	06/27/18 16:53	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D8(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-7R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-8R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 74.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-9R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 95.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42	0.42	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-10R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-11R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.51	0.44	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-12R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 91.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	06/27/18 17:35	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-13R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-14R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(12.0-12.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-15R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 49.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.80	0.80	mg/kg	1	06/27/18 17:35	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(14.0-14.5)	Date Sampled: 06/25/18
Lab Sample ID: JC68675-16R	Date Received: 06/25/18
Matrix: SO - Soil	Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64	0.64	mg/kg	1	06/27/18 17:35	RI	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC68783

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30415R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC68783 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180626)	JC68783-1	Water	6/26/2018		X	X	X
SW-D2(0.0-0.5)	JC68783-2	Soil	6/26/2018		X	X	X
SW-D2(2.0-2.5)	JC68783-3	Soil	6/26/2018		X	X	X
SW-D2(4.0-4.5)	JC68783-4	Soil	6/26/2018		X	X	X
SW-D2(6.0-6.5)	JC68783-5	Soil	6/26/2018		X	X	X
SW-D2(8.0-8.5)	JC68783-6	Soil	6/26/2018		X	X	X
SW-D2(10.0-10.5)	JC68783-7	Soil	6/26/2018		X	X	X
SW-D2(12.0-12.5)	JC68783-8	Soil	6/26/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All analytes associated with low-level calibration verification standard recoveries were within control limits with the exception of the analytes presented in the following table.

DATA REVIEW REPORT

Sample Locations	Analytes	Recovery
SW-D2(0.0-0.5)	Antimony	< 30%
SW-D2(2.0-2.5)		
SW-D2(4.0-4.5)		
SW-D2(6.0-6.5)		
SW-D2(8.0-8.5)	Thallium	> 150%
SW-D2(10.0-10.5)		
SW-D2(12.0-12.5)		

In the case of a deviation, the sample results are qualified.

Low-Level Calibration Standard Recovery Criteria			
Analytes	Control Limit	Sample Result	Qualification
All analytes, with the exception of Al, Ba, Ca, Fe, Mg, Na, and K	%R <50% (<30% for Sb, Pb, Tl)	Sample results \geq MDL but <2x RL	R
		Non-detect sample results	R
		Detected sample results \geq 2x RL	J
	%R 50-69% (30-49% for Sb, Pb, Tl)	Sample results \geq MDL but <2x RL	J
		Non-detect sample results	UJ
		Detected sample results \geq 2x RL	No Action
	%R >130% but <180% (>150% but <200% for Sb, Pb, Tl)	Sample results \geq MDL but <2x RL	J
		Non-detect sample results	No Action
		Detected sample results \geq 2x RL	No Action
	%R >180% (>200% for Sb, Pb, Tl)	Sample results \geq MDL	R

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

DATA REVIEW REPORT

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-D2(6.0-6.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D2(6.0-6.5)	Antimony	64.5%	62.9%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-D2(6.0-6.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location SW-D2(6.0-6.5) exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-D2(0.0-0.5) in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D2(0.0-0.5)	Hexavalent Chromium, Soluble	< 50%	Not reanalyzed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analysis of the field samples will be considered usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-D2(0.0-0.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied

DATA REVIEW REPORT

when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location SW-D2(0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample location SW-D2(8.0-8.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not collected for a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: August 28, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB(2018062618)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-1	Date Received: 06/26/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/26/18 20:45	LS	SW846 7196A
Redox Potential Vs H2	374		mv	1	06/27/18 11:30	RI	ASTM D1498-76
pH ^a	5.81		su	1	06/26/18 18:50	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-2	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 95.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	06/28/18 12:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	06/27/18 12:45	RI	ASTM D1498-76M
Solids, Percent	95.6		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	8.35		su	1	06/27/18 12:12	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-3	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	403		mv	1	06/27/18 12:57	RI	ASTM D1498-76M
Solids, Percent	87.9		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	7.79		su	1	06/27/18 12:15	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-4	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 90.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52 J-	0.44	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	400		mv	1	06/27/18 12:59	RI	ASTM D1498-76M
Solids, Percent	90		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	8.07		su	1	06/27/18 12:18	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)		Date Sampled: 06/26/18
Lab Sample ID: JC68783-5		Date Received: 06/26/18
Matrix: SO - Soil		Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	357		mv	1	06/27/18 13:03	RI	ASTM D1498-76M
Solids, Percent	85.3		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	7.98		su	1	06/27/18 12:22	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-6	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	06/27/18 12:39	RI	ASTM D1498-76M
Solids, Percent	88.1		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	8.34		su	1	06/27/18 12:10	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5) Lab Sample ID: JC68783-7 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 78.2
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	06/27/18 13:09	RI	ASTM D1498-76M
Solids, Percent	78.2		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	8.16		su	1	06/27/18 12:34	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(12.0-12.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-8	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 79.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	06/28/18 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	55.8		mv	1	06/27/18 13:23	RI	ASTM D1498-76M
Solids, Percent	79.6		%	1	06/27/18 09:10	RC	SM2540 G 18TH ED MOD
pH	10.59		su	1	06/27/18 12:38	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: FB(2018062618) Lab Sample ID: JC68783-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/27/18	06/27/18 ND	SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/27/18	06/27/18 ND	SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/27/18	06/27/18 ND	SW846 6010C ¹	SW846 3010A ²
Thallium	< 2.0	2.0	ug/l	1	06/27/18	06/27/18 ND	SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/27/18	06/27/18 ND	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44723

(2) Prep QC Batch: MP7842

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(2018062618)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-1A	Date Received: 06/26/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/27/18 20:51	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5) Lab Sample ID: JC68783-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 95.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 2.1	2.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹	SW846 3050B² R
Chromium	161	1.0	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Nickel	46.0	4.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	99.1	5.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-2A	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 95.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	161	1.4	mg/kg	1	06/28/18 12:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5) Lab Sample ID: JC68783-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 87.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 2.2	2.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹	SW846 3050B² R
Chromium	373	1.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Nickel	50.1	4.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	142	5.4	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-3A	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	373	1.6	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5) Lab Sample ID: JC68783-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 90.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 2.2	2.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹	SW846 3050B² R
Chromium	21.6	1.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Nickel	19.4	4.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	41.6	5.4	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-4A	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 90.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.1	1.5	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5) Lab Sample ID: JC68783-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 85.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹ SW846 3050B² R
Chromium	21.1	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Nickel	45.6	4.8	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Vanadium	23.1	6.0	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-5A	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.1	1.7	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5) Lab Sample ID: JC68783-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 88.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 2.3	2.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹	SW846 3050B² R
Chromium	15.4	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Nickel	43.4	4.7	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	16.1	5.9	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)	Date Sampled: 06/26/18
Lab Sample ID: JC68783-6A	Date Received: 06/26/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4	1.7	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5) Lab Sample ID: JC68783-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 78.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹ SW846 3050B² R
Chromium	23.4	1.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Nickel	30.2	5.0	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²
Vanadium	26.5	6.3	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5)		Date Sampled: 06/26/18
Lab Sample ID: JC68783-7A		Date Received: 06/26/18
Matrix: SO - Soil		Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.4	1.8	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(12.0-12.5) Lab Sample ID: JC68783-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/26/18 Date Received: 06/26/18 Percent Solids: 79.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 2.4	2.4	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C¹	SW846 3050B² R
Chromium	19.8	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Nickel	59.2	4.8	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²
Vanadium	22.2	6.0	mg/kg	1	06/27/18	06/27/18	ND	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44727

(2) Prep QC Batch: MP7847

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D2(12.0-12.5)		Date Sampled: 06/26/18
Lab Sample ID: JC68783-8A		Date Received: 06/26/18
Matrix: SO - Soil		Percent Solids: 79.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.8	1.7	mg/kg	1	06/28/18 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC68947

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30416R

Review Level: Tier III

Project: NP000770.0001.00008



DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC68947 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
DUP-3 (20180628)	JC68947-1	Soil	6/28/2018	SW-D8(14.0-14.5)	X	X	X
SW-D9(14.0-14.5)	JC68947-2	Soil	6/28/2018		X	X	X
SW-D10(14.0-14.5)	JC68947-3	Soil	6/28/2018		X	X	X
SW-D8(14.0-14.5)	JC68947-4	Soil	6/28/2018		X	X	X
FB (20180628)	JC68947-5	Water	6/28/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X ¹	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

¹ The analysis of samples collected from locations SW-D7 and SW-D8 D7 listed on the COC form were cancelled.

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All analytes associated with low-level calibration verification standard recoveries were within control limits.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-D2(6.0-6.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D9(14.0-14.5)	Nickel	AC (91.6%)	> 125%

Notes:

AC = Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit are presented in the following table.

Sample Location	Analytes	MS/MSD RPD
SW-D9(14.0-14.5)	Nickel	47.3%

The criteria used to evaluate MS/MSD RPD are presented in the following table. In the case of a MS/MSD RPD deviation, the sample results are qualified. The qualifications are applied to the all sample results associated with this SDG.

Control Limit	Sample Result	Qualification
> 20% (water) or >35% (soil)	Non-detect	UJ
	Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D8(14.0-14.5) / DUP-3 (20180628)	Chromium	16.3	21.3	26.6%
	Trivalent Chromium	16.3	21.3	26.6%
	Nickel	93.2	394	124%
	Vanadium	21.4	25.1	AC

Notes:

AC = Acceptable

The nickel results associated with samples locations SW-D8(14.0-14.5) and DUP-3(20180628) were not in agreement. The associated sample results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

DATA REVIEW REPORT

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location SW-D9(14.0-14.5) exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Holding Time	Criteria
FB (20180628)	Analysis: 27 hours	< 24 hours

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

DATA REVIEW REPORT

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D9(14.0-14.5)	Hexavalent Chromium, Insoluble	< 50%	Not reanalyzed
	Hexavalent Chromium, Soluble	< 50%	Not reanalyzed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

Note: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use ("RA" qualifier).

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

Spike recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery
SW-D9(14.0-14.5)	Hexavalent Chromium	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location SW-D9(14.0-14.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D8(14.0-14.5) / DUP-3 (20180628)	Hexavalent Chromium	0.59 U	0.55 U	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-D8(14.0-14.5) and field duplicate sample DUP-3 (20180628) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample location SW-D9(14.0-14.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D8(14.0-14.5) / DUP-3 (20180628)	Redox Potential	182	148	20.6%
	pH	6.83	6.65	2.7%

The differences in the results between the parent sample SW-D8(14.0-14.5) and field duplicate sample DUP-3(20180628) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: August 29, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL. 732-329-0200 FAX 732-329-3499
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FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	LS-06818-138 JC68947

Client Reporting Information			Project Information					Requested Analysis (see TEST CODE sheet)								Matrix Codes									
Company Name Arcadis	Project Name PPG Jersey City 107												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank												
Street Address 10 Friends Lane Suite 200	Street 18 Chapel Avenue	City Newtown PA	State PA	Zip 18440	City Jersey City	State N.J.	Billing Information (if different from Report to)																		
Project Contact Krista Mashroccia	E-mail KMA@arcadis.com	Project # NP000770.0001.00005	Street Address																						
Phone # 610.755.7080	Fax #	Client Purchase Order #	City								State		Zip												
Sampler(s) Name(s) Christina Cicelli	Phone #	Project Manager Jim McLaughlin	Attention:																						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection			Matrix	# of bottles	Number of preserved bottles								LAB USE ONLY									
			Date	Time	Sampled by			HCl	NaN3	HNO3	H2SO4	HClO4	None	DI Water	MEOH		ENCORE								
1	SW-D9 DUF-3 (20180628)		6/28/18		CC	SO	1										X	X	X	X	X	X	X	X	ACB CSZ
2	SW-D9 (14.0-14.5) MS		6/28/18	1215	CC	SO	1										X	X	X	X	X	X	X	X	
	SW-D9 (14.0-14.5) MJD		6/28/18	1215	CC	SO	1										X	X	X	X	X	X	X	X	
3	SW-D10 (14.0-14.5)		6/28/18	1220	CC	SO	1										X	X	X	X	X	X	X	X	
4	SW-D8 (14.0-14.5)		6/28/18	1210	CC	SO	1										X	X	X	X	X	X	X	X	
5	FB (20180628)		6/28/18	0700	CC	SO	1										X	X	X	X	X	X	X	X	
6	SW-D8 (0.0-0.5)		6/28/18	1050	CC	SO	1										X	X	X	X	X	X	X	X	
7	SW-D8 (2.0-2.5)		6/28/18	1055	CC	SO	1										X	X	X	X	X	X	X	X	INITIAL ASSESSMENT 2B
8	SW-D8 (4.0-4.5)		6/28/18	1100	CC	SO	1										X	X	X	X	X	X	X	X	
9	SW-D8 (6.0-6.5)		6/28/18	1105	CC	SO	1										X	X	X	X	X	X	X	X	LABEL VERIFICATION
Turnaround Time (Business days)			Data Deliverable Information					Comments / Special Instructions																	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other			Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other								*Discuss w/ Krista Mashroccia on SW-D7 and SW-D8 analyses.									
Emergency & Rush T/A data available via LabLink			Sample Custody must be documented below each time samples change possession, including courier delivery.					Sample inventory is verified upon receipt in the Laboratory																	
Relinquished by Sampler	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time						
1	6/28/18 1420	2	6/28/18 1420	3	6/28/18 1420	4	6/28/18 1420	5	6/28/18 1420	6	6/28/18 1420	7	6/28/18 1420	8	6/28/18 1420	9	6/28/18 1420	10	6/28/18 1420						
Relinquished by:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time						
5		6		7		8		9		10		11		12		13		14							
			Custody Seal #			<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not Intact			Preserved where applicable <input type="checkbox"/>			On Ice <input checked="" type="checkbox"/>			Cooler Temp. 3.6°C										

5.2
5



SGS North America Inc. - Dayton
 2235 Route 130, Dayton, NJ 08810
 TEL: 732-329-0200 FAX: 732-329-3499
 www.sgs.com/ehsusua

Field ID Tracking # _____
 Matrix Code # **5168947**
 SAS Code # _____

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)													Matrix Codes									
Company Name Accadis		Project Name PPG Jersey City 107																	DW - Drinking Water GM - Groundwater WA - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank									
Street Address 10 Friends Lane, Suite 200 Newtown PA 18440		Street 18 Chapel Avenue Jersey City N.J.		Billing Information (if different from Report to) Company Name _____																								
City Newtown PA 18440		City Jersey City N.J.		Street Address _____																								
Project Contact Krishna Marzicola		Project # NP000770.0001.00005		City State Zip																								
Phone # 610.755.7080		Client Purchase Order # _____		Attention _____																								
Sampler(s) Name(s) Christa Cifelli		Project Manager Sim McLaughlin																										
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vol #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles							<table border="1"> <tr> <td>Total Chromium</td> <td>Hexavalent Chromium</td> <td>Trivalent Chromium</td> <td>Antimony</td> <td>Nickel</td> <td>Thallium</td> <td>Vanadium</td> </tr> </table>						Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY
								Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium														
NO	NO/2	NO/3	NO/4	NO/5	NO/6	NO/7																						

Turnaround Time (Business days): _____
 Approved by (SGS Project Manager)/Date: _____
 Std. 10 Business Days
 5 Day RUSH
 3 Day RUSH
 2 Day RUSH
 1 Day RUSH
 other _____

Commercial "A" (Level 1)
 Commercial "B" (Level 2)
 FULL T1 (Level 3-4)
 NJ Reduced
 Commercial "C"
 NJ Data of Known Quality Protocol Reporting

Commercial "A" = Results Only; Commercial "B" = Results + QC Summary
 Commercial "C" = Results + QC Summary + Parcel Raw data

Sample inventory is verified upon receipt in the Laboratory

* Discuss w/ Krishna Marzicola on SW-D7 and SW-DB analyses

Sample Custody must be documented below each time samples change possession including courier delivery

Relinquished by Sampler: Cifelli	Date Time: 6/28/18 1420	Received By: [Signature]	Date Time: _____
Relinquished by Sampler: [Signature]	Date Time: _____	Received By: [Signature]	Date Time: 6/28/18 1420
Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____

Custody Seal: **04380**
01922

Intact Not Intact

Preserved where applicable:

On Site: **36.02**
5.5

Form:SM068-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions



Report of Analysis

Client Sample ID: DUP-3 (20180628)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-1	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 RA	0.55	mg/kg	1	06/30/18 13:26	DC	SW846 3060A/7196A ✗
Redox Potential Vs H2	148		mv	1	06/29/18 14:35	RI	ASTM D1498-76M
Solids, Percent	72.1		%	1	06/29/18 15:48	SF	SM2540 G 18TH ED MOD
pH	6.65		su	1	06/29/18 14:28	RI	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D9 (14.0-14.5)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-2	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 74.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54 RA	0.54	mg/kg	1	06/30/18 13:16	DC	SW846 3060A/7196A
Redox Potential Vs H2	175		mv	1	06/29/18 14:26	RI	ASTM D1498-76M
Solids, Percent	74.1		%	1	06/29/18 15:48	SF	SM2540 G 18TH ED MOD
pH	6.71		su	1	06/29/18 14:24	RI	SW846 9045D


RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10 (14.0-14.5)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-3	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 RA	0.63	mg/kg	1	06/30/18 13:26	DC	SW846 3060A/7196A 
Redox Potential Vs H2	132		mv	1	06/29/18 14:45	RI	ASTM D1498-76M
Solids, Percent	63.6		%	1	06/29/18 15:48	SF	SM2540 G 18TH ED MOD
pH	6.54		su	1	06/29/18 14:30	RI	SW846 9045D


RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8 (14.0-14.5)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-4	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 68.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59 RA	0.59	mg/kg	1	06/30/18 13:26	DC	SW846 3060A/7196A 
Redox Potential Vs H2	182		mv	1	06/29/18 14:49	RI	ASTM D1498-76M
Solids, Percent	68.2		%	1	06/29/18 15:48	SF	SM2540 G 18TH ED MOD
pH	6.83		su	1	06/29/18 14:34	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180628) Lab Sample ID: JC68947-5 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/18 Date Received: 06/28/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010 UJ	0.010	mg/l	1	06/29/18 09:49	RI	SW846 7196A
Redox Potential Vs H2	550		mv	1	06/29/18 12:31	RI	ASTM D1498-76
pH ^b	5.26		su	1	06/29/18 15:27	SUB	SM4500H+ B-11

(a) Analysis done out of holding time.

(b) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-3 (20180628) Lab Sample ID: JC68947-1A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/18 Date Received: 06/28/18 Percent Solids: 72.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Chromium	21.3	1.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Nickel	394 J+	5.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Vanadium	25.1	6.8	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44748

(2) Prep QC Batch: MP7890

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: DUP-3 (20180628)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-1A	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.3	2.0	mg/kg	1	06/30/18 13:26	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D9 (14.0-14.5) Lab Sample ID: JC68947-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/18 Date Received: 06/28/18 Percent Solids: 74.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Chromium	8.4	1.3	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Nickel	72.4 J+	5.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Vanadium	19.3	6.7	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44748

(2) Prep QC Batch: MP7890

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D9 (14.0-14.5)		Date Sampled: 06/28/18
Lab Sample ID: JC68947-2A		Date Received: 06/28/18
Matrix: SO - Soil		Percent Solids: 74.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.2
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.4	1.8	mg/kg	1	06/30/18 13:16	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10 (14.0-14.5) Lab Sample ID: JC68947-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/18 Date Received: 06/28/18 Percent Solids: 63.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Chromium	17.6	1.5	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Nickel	95.8 J+	6.1	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Vanadium	23.3	7.6	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44748

(2) Prep QC Batch: MP7890

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10 (14.0-14.5)		Date Sampled: 06/28/18
Lab Sample ID: JC68947-3A		Date Received: 06/28/18
Matrix: SO - Soil		Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.3	2.1	mg/kg	1	06/30/18 13:26	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8 (14.0-14.5)	Date Sampled: 06/28/18
Lab Sample ID: JC68947-4A	Date Received: 06/28/18
Matrix: SO - Soil	Percent Solids: 68.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Chromium	16.3	1.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Nickel	93.2 J+	5.6	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²
Vanadium	21.4	7.0	mg/kg	1	06/29/18	06/29/18 PP	SW846 6010C ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44748

(2) Prep QC Batch: MP7890

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8 (14.0-14.5)		Date Sampled: 06/28/18
Lab Sample ID: JC68947-4A		Date Received: 06/28/18
Matrix: SO - Soil		Percent Solids: 68.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.3	2.0	mg/kg	1	06/30/18 13:26	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180628) Lab Sample ID: JC68947-5A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/18 Date Received: 06/28/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/29/18	06/30/18	ND SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/29/18	06/30/18	ND SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/29/18	06/30/18	ND SW846 6010C ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/29/18	06/30/18	ND SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/29/18	06/30/18	ND SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44747

(2) Prep QC Batch: MP7891

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB (20180628)		Date Sampled: 06/28/18
Lab Sample ID: JC68947-5A		Date Received: 06/28/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/30/18 07:00	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC69566

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30417R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC69566 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180710)	JC69566-1	Water	7/10/2018		X	X	X
SW-S10(12.0-12.5)A	JC69566-2	Soil	7/10/2018			X	
107-I044	JC69566-3	Soil	7/10/2018		X	X	X
SW-D3(16.0-16.5)	JC69566-4	Soil	7/10/2018		X	X	X
SW-D8(16.0-16.5)	JC69566-5	Soil	7/10/2018		X	X	X
SW-D4(15.5-16.0)	JC69566-6	Soil	7/10/2018		X	X	X
SW-D9(15.5-16.0)	JC69566-7	Soil	7/10/2018		X	X	X
SW-D10(15.5-16.0)	JC69566-8	Soil	7/10/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All analytes associated with low-level calibration verification standard recoveries were within control limits.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

MS/MSD analysis was not performed using a sample from this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

Laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

Serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location 107-I044 in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
107-I044	Hexavalent Chromium, Soluble	< 50%	Not reanalyzed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

Spike recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery
107-I044	Hexavalent Chromium	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

DATA REVIEW REPORT

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location 107-I044 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
107-I044 SW-D3(16.0-16.5) SW-D8(16.0-16.5) SW-D4(15.5-16.0) SW-D9(15.5-16.0) SW-D10(15.5-16.0)	SW846 9045D	Analysis: < 48 hours of receipt at laboratory	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

DATA REVIEW REPORT

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location 107-I044 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: August 29, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking # _____ Bottle Order Control # LS-06818-138
SGS Quote # _____ SGS Job # JC69566

Client / Reporting Information			Project Information					Requested Analysis (see TEST CODE sheet)										Matrix Codes																			
Company Name: <u>Arcadis</u>			Project Name: <u>PPG Jersey City Site 107</u>					<table border="1"><tr><td><i>Trivalent Chromium</i></td><td><i>Hexavalent Chromium</i></td><td><i>Trivalent Chromium</i></td><td><i>Antimony</i></td><td><i>Nickel</i></td><td><i>Thallium</i></td><td><i>Vanadium</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										<i>Trivalent Chromium</i>	<i>Hexavalent Chromium</i>	<i>Trivalent Chromium</i>	<i>Antimony</i>	<i>Nickel</i>	<i>Thallium</i>	<i>Vanadium</i>													Matrix Codes
<i>Trivalent Chromium</i>	<i>Hexavalent Chromium</i>	<i>Trivalent Chromium</i>	<i>Antimony</i>	<i>Nickel</i>	<i>Thallium</i>	<i>Vanadium</i>																															
Street Address: <u>10 Friends Lane Suite 200</u>			Street: <u>18 Chapel Avenue</u>		Billing Information (if different from Report to)													DW - Drinking Water																			
City: <u>Newton PA</u>			City: <u>Jersey City N.J.</u>		Company Name													GW - Ground Water																			
Project Contact: <u>Krista Maskecola</u>			Project #: <u>NP000770.0001.00005</u>		Street Address													WW - Water																			
Phone #: <u>610.755.7080</u>			Client Purchase Order #: _____		City: _____ State: _____ Zip: _____													SW - Surface Water																			
Sampler(s) Name(s): <u>Christina Pigi</u>			Project Manager: <u>Jim McLaughlin</u>		Attention: _____			SO - Soil																													
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection		Date	Time	Sampled by	Matrix	# of bottles	HCl	MCH	HNO3	H2SO4	NONE	Dl Water	MCH	ENCORE	LAB USE ONLY																			
1	FB(20180710)				7/10/18	0630	CC	EB	4				2	2				A/C																			
2	SW-D10(12.0-12.5)A				7/10/18	0855	CC	SO	1					1				D5																			
3	107-1044				7/10/18	1000	CC	SO	1					1																							
4	SW-D3(16.0-16.5)				7/10/18	1010	CC	SO	1					1																							
5	SW-DB(16.0-16.5)				7/10/18	1020	CC	SO	1					1																							
6	SW-D4(15.5-16.0)				7/10/18	1030	CC	SO	1					1																							
7	SW-D9(15.5-16.0)				7/10/18	1040	CC	SO	1					1																							
8	SW-D10(15.5-16.0)				7/10/18	1050	CC	SO	1					1																							
Turnaround Time (Business days)			Data Deliverable Information					Comments / Special Instructions																													
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____			Approved by (SGS Project Manager)/Date: _____					<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format <i>Egus</i> <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other _____ <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting					INITIAL ASSESSMENT <i>JL 36</i>																								
Emergency & Rush T/A data available via LabLink			Commercial "A" = Results Only; Commercial "B" = Results + QC Summary					Sample inventory is verified upon receipt in the Laboratory					LABEL VERIFICATION _____																								
Relinquished by Sampler:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:	Relinquished By:	Date Time:																		
1 <i>[Signature]</i>	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345	Robert chambers	7/10/18 1345																		
3																																					
5																																					
Custody Seal # <u>09822</u>	Intact <input type="checkbox"/>	Not intact <input type="checkbox"/>	Preserved where applicable <input type="checkbox"/>	Op Ice <input checked="" type="checkbox"/>	Cooler Temp <input checked="" type="checkbox"/> 3.2°C																																

http://www.sgs.com/en/terms-and-conditions.

Report of Analysis

Client Sample ID: FB(20180710) Lab Sample ID: JC69566-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/10/18 Date Received: 07/10/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/10/18 22:00	LS	SW846 7196A
Redox Potential Vs H2	450		mv	1	07/12/18 14:44	JOO	ASTM D1498-76
pH ^a	4.31		su	1	07/10/18 18:00	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107-I044	Date Sampled: 07/10/18
Lab Sample ID: JC69566-3	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J-	0.57	mg/kg	1	07/12/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	174		mv	1	07/12/18 13:39	JOO	ASTM D1498-76M
Solids, Percent	70		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.64 J		su	1	07/12/18 13:39	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D3(16.0-16.5)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-4	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	07/12/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	07/12/18 13:43	JOO	ASTM D1498-76M
Solids, Percent	72.1		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.87 J		su	1	07/12/18 13:43	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D8(16.0-16.5)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-5	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 63.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.63	mg/kg	1	07/12/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	161		mv	1	07/12/18 13:49	JOO	ASTM D1498-76M
Solids, Percent	63.4		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.41 J		su	1	07/12/18 13:46	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D4(15.5-16.0)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-6	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.62 UJ-	0.62	mg/kg	1	07/12/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	197		mv	1	07/12/18 13:59	JOO	ASTM D1498-76M
Solids, Percent	64.5		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.80 J		su	1	07/12/18 13:59	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D9(15.5-16.0)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-7	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 61.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.65 UJ-	0.65	mg/kg	1	07/12/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	07/12/18 14:05	JOO	ASTM D1498-76M
Solids, Percent	61.7		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.94 J		su	1	07/12/18 14:05	JOO	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D10(15.5-16.0)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-8	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.73 J-	0.60	mg/kg	1	07/12/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	195		mv	1	07/12/18 14:10	JOO	ASTM D1498-76M
Solids, Percent	66.9		%	1	07/11/18 14:50	LV	SM2540 G 18TH ED MOD
pH	6.60 J		su	1	07/12/18 14:10	JOO	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20180710)		Date Sampled: 07/10/18
Lab Sample ID: JC69566-1A		Date Received: 07/10/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8053

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180710)		Date Sampled: 07/10/18
Lab Sample ID: JC69566-1A		Date Received: 07/10/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/12/18 03:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-S10(12.0-12.5)A	Date Sampled: 07/10/18
Lab Sample ID: JC69566-2	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 51.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	403	7.9	mg/kg	1	07/11/18	07/12/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107-I044		Date Sampled: 07/10/18
Lab Sample ID: JC69566-3A		Date Received: 07/10/18
Matrix: SO - Soil		Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	07/12/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.8	1.4	mg/kg	1	07/12/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	37.3	5.4	mg/kg	1	07/12/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/12/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	17.5	6.8	mg/kg	1	07/12/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44835

(2) Prep QC Batch: MP8064

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107-I044	Date Sampled: 07/10/18
Lab Sample ID: JC69566-3A	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.0	2.0	mg/kg	1	07/12/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(16.0-16.5)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-4A	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.5	1.4	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	112	5.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.6	6.9	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D3(16.0-16.5)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-4A	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.5	2.0	mg/kg	1	07/12/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D8(16.0-16.5) Lab Sample ID: JC69566-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/10/18 Date Received: 07/10/18 Percent Solids: 63.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.9	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	204	6.1	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.7	7.7	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D8(16.0-16.5)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-5A	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 63.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.9	2.1	mg/kg	1	07/12/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(15.5-16.0) Lab Sample ID: JC69566-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/10/18 Date Received: 07/10/18 Percent Solids: 64.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	7.9	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	7.6	6.0	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	12.5	7.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(15.5-16.0)		Date Sampled: 07/10/18
Lab Sample ID: JC69566-6A		Date Received: 07/10/18
Matrix: SO - Soil		Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.3	2.1	mg/kg	1	07/12/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D9(15.5-16.0) Lab Sample ID: JC69566-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/10/18 Date Received: 07/10/18 Percent Solids: 61.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2	3.2	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.6	1.6	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	83.9	6.4	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.8	7.9	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D9(15.5-16.0)	Date Sampled: 07/10/18
Lab Sample ID: JC69566-7A	Date Received: 07/10/18
Matrix: SO - Soil	Percent Solids: 61.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.6	2.3	mg/kg	1	07/12/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D10(15.5-16.0) Lab Sample ID: JC69566-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/10/18 Date Received: 07/10/18 Percent Solids: 66.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.9	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	31.5	5.9	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.9	7.4	mg/kg	1	07/11/18	07/12/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44830

(2) Prep QC Batch: MP8052

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D10(15.5-16.0)		Date Sampled: 07/10/18
Lab Sample ID: JC69566-8A		Date Received: 07/10/18
Matrix: SO - Soil		Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	2.1	mg/kg	1	07/12/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC69982

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30418R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC69982 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180716)	JC69982-1	Water	7/16/2018		X	X	X
SW-D7(10.0-10.5)	JC69982-2	Soil	7/16/2018		X	X	X
SW-D7(12.0-12.5)	JC69982-3	Soil	7/16/2018		X	X	X
SW-D7(14.0-14.5)	JC69982-4	Soil	7/16/2018		X	X	X
SW-D7(16.0-16.5)	JC69982-5	Soil	7/16/2018		X	X	X
SW-D7(18.0-18.5)	JC69982-6	Soil	7/16/2018		X	X	X
SW-D2(14.0-14.5)	JC69982-7	Soil	7/16/2018		X	X	X
SW-D2(16.0-16.5)	JC69982-8	Soil	7/16/2018		X	X	X
SW-D2(18.0-18.5)	JC69982-9	Soil	7/16/2018		X	X	X
SW-D2(20.0-20.5)	JC69982-10	Soil	7/16/2018		X	X	X
SW-D1(0.0-0.5)	JC69982-11	Soil	7/16/2018		X	X	X
SW-D1(2.0-2.5)	JC69982-12	Soil	7/16/2018		X	X	X
SW-D1(4.0-4.5)	JC69982-13	Soil	7/16/2018		X	X	X
SW-D1(6.0-6.5)	JC69982-14	Soil	7/16/2018		X	X	X
SW-D1(8.0-8.5)	JC69982-15	Soil	7/16/2018		X	X	X
SW-D1(10.0-10.5)	JC69982-16	Soil	7/16/2018		X	X	X
SW-D1(12.0-12.5)	JC69982-17	Soil	7/16/2018		X	X	X
SW-D1(14.0-14.5)	JC69982-18	Soil	7/16/2018		X	X	X
SW-D1(16.0-16.5)	JC69982-19	Soil	7/16/2018		X	X	X
SW-D1(18.0-18.5)	JC69982-20	Soil	7/16/2018		X	X	X
SW-D1(20.0-20.5)	JC69982-21	Soil	7/16/2018		X	X	X
SW-D6(0.0-0.5)	JC69982-22	Soil	7/16/2018		X	X	X
SW-D11(20.0-20.5)	JC69982-23	Soil	7/16/2018		X	X	X
SW-D11(18.0-18.5)	JC69982-24	Soil	7/16/2018		X	X	X
SW-D11(16.0-16.5)	JC69982-25	Soil	7/16/2018		X	X	X

DATA REVIEW REPORT

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
SW-D11(14.0-14.5)	JC69982-26	Soil	7/16/2018		X	X	X
SW-D11(12.0-12.5)	JC69982-27	Soil	7/16/2018		X	X	X
SW-D6(20.0-2.5)	JC69982-28	Soil	7/16/2018		X	X	X
SW-D6(18.0-18.5)	JC69982-29	Soil	7/16/2018		X	X	X
SW-D6(16.0-16.5)	JC69982-30	Soil	7/16/2018		X	X	X
SW-D6(14.0-14.5)	JC69982-31	Soil	7/16/2018		X	X	X
SW-D6(10.0-10.5)	JC69982-32	Soil	7/16/2018		X	X	X
SW-D5(20.0-20.5)	JC69982-33	Soil	7/16/2018		X	X	X
SW-D5(18.0-18.5)	JC69982-34	Soil	7/16/2018		X	X	X
SW-D5(16.0-16.5)	JC69982-35	Soil	7/16/2018		X	X	X
SW-D5(14.0-14.5)	JC69982-36	Soil	7/16/2018		X	X	X
SW-D6(12.0-12.5)	JC69982-37	Soil	7/16/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All analytes associated with low-level calibration verification standard recoveries were within control limits.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-D2(6.0-6.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D7(10.0-10.5)	Antimony	62.7%	61.9%
SW-D6(0.0-0.5)	Antimony	61.4%	62.0%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-D7(10.0-10.5) and SW-D6(0.0-0.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample locations SW-D7(10.0-10.5) and SW-D6(0.0-0.5) exhibited %D within the control limit.

8. System Performance and Overall Assessment

The thallium result in sample SW-D7(14.0-14.5) was reported as non-detected at an elevated reporting limit of 2.8mg/kg. The sample required dilution due to an interfering element.

The antimony result in sample SW-D6(14.0-14.5) was reported as non-detected at an elevated reporting limit of 28mg/kg. The sample required dilution due to an interfering element.

The antimony result in sample SW-D6(10.0-10.5) was reported as non-detected at an elevated reporting limit of 24mg/kg. The sample required dilution due to an interfering element.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-D1(8.0-8.5) exhibited recoveries within the control limits.

The MS analysis performed on sample location SW-D5(16.0-16.5) in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D5(16.0-16.5)	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

Spike recoveries were outside of the control limits as presented in the table below.

DATA REVIEW REPORT

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
SW-D5(16.0-16.5)	Hexavalent Chromium	< 85%	AC

Notes:

AC = Acceptable

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-D1(8.0-8.5) and SW-D5(16.0-16.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-D1(20.0-20.5) SW-D6(0.0-0.5) SW-D11(20.0-20.5) SW-D11(18.0-18.5) SW-D11(16.0-16.5) SW-D11(14.0-14.5) SW-D11(12.0-12.5) SW-D6(20.0-2.5) SW-D6(18.0-18.5) SW-D6(16.0-16.5) SW-D6(14.0-14.5) SW-D6(10.0-10.5) SW-D5(20.0-20.5) SW-D5(18.0-18.5) SW-D5(16.0-16.5) SW-D5(14.0-14.5) SW-D6(12.0-12.5)	SW846 9045D	Analysis: < 48 hours of receipt at laboratory	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations FB(20180716), SW-D7(10.0-10.5), and SW-D1(20.0-20.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: August 29, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order/Control # **LS-07218-11**
SGS Quote #
SGS Job # **5269982**

Client / Reporting Information			Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes
Company Name Arcadis			Project Name PPG Jersey City site 107				Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 Friends Lane Suite 200			Street 18 Chapel Avenue														
City State Zip Newtown NJ 08440			City State Jersey City NJ														
Project Contact Krista Mastrosala			Project # NP000770.0001.00005														
Billing Information (if different from Report to)			Company Name														
Street Address			Street Address														
Phone # 610.755.7080			Client Purchase Order #														
City State Zip			City State Zip														
Sampler(s) Name(s) Charish Cielli			Project Manager Jim McLaughlin														
Phone # 201.264.2003			Attention:														
Lab Sample #			Collection				Number of preserved bottles										LAB USE ONLY
Field ID / Point of Collection			MEQ/HD1 Vial #														
Date			Time														
Sampled by			Matrix														
# of bottles																	
HCl			NaOH														
MNO3			H2SO4														
NONE			DI Water														
MEOH			BNCORE														
BNCORE																	
1			FB (20180716)														AZZ
2			SW-D7 (10.0-10.5)														GSD
3			SW-D7 (12.0-12.5)														
4			SW-D7 (14.0-14.5)														
5			SW-D7 (16.0-16.5)														
6			SW-D7 (18.0-18.5)														
7			SW-D7 (14.0-14.5)														
8			SW-D7 (16.0-16.5)														
9			SW-D7 (18.0-18.5)														
10			SW-D7 (20.0-20.5)														
11			SW-D1 (0.0-0.5)														
Turnaround Time (Business days)			Data Deliverable Information				Comments / Special Instructions										
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other			Approved by (SGS Project Manager)/Date:				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equus</i> <input type="checkbox"/> Other
Emergency & Rush TIA data available via LabLink			Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory										
Retinquished by Sampler:			Date Time:				Date Time:										Date Time:
1			7/16/18 1010				7/16/18 415										7/16/18 1706
Retinquished by Sampler:			Date Time:				Date Time:										Date Time:
3																	
Retinquished by:			Date Time:				Date Time:										Date Time:
5																	
Custody Seal #			Intact				Preserved where applicable										On Ice
			Not Intact														Cooler Temp.
																	5.9-33

Form:SM088-03C (revised 2/12/18)

JC69982: Chain of Custody

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5.2
5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
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www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC69982

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Lab Sample #, Collection, Data Deliverable Information, Approved by (SGS Project Manager)/Date, Sample Custody must be documented below each time samples change possession, including courier delivery.

5.2
5

34 33





CHAIN OF CUSTODY

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www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC69982

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Lab Sample #, Field ID / Point of Collection, Date, Time, Sampled by, Matrix, # of bottles, HCl, MEQH, HNO3, H2SO4, NONE, DI Water, MEQH, ENDORE, Total Chromium, Hexavalent Chromium, Trivalent Chromium, Arsenic, Nickel, Thallium, Vanadium, LAB USE ONLY, Turnaround Time, Approved by (SGS Project Manager)/Date, Data Deliverable Information, Comments / Special Instructions, Sample Custody must be documented below each time samples change possession, including courier delivery.

5.2
5

34.33



Report of Analysis

Client Sample ID: FB(20180716)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-1	Date Received: 07/16/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/16/18 19:17	LS	SW846 7196A
Redox Potential Vs H2	262		mv	1	07/18/18 16:11	RB	ASTM D1498-76
pH ^a	5.47		su	1	07/16/18 17:20	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (10.0-10.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-2	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82	0.48	mg/kg	1	07/18/18 12:12	RP	SW846 3060A/7196A
Redox Potential Vs H2	195		mv	1	07/17/18 15:02	RB	ASTM D1498-76M
Solids, Percent	83.7		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	7.22		su	1	07/17/18 14:41	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-3	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.51	mg/kg	1	07/18/18 12:12	RP	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	07/17/18 15:10	RB	ASTM D1498-76M
Solids, Percent	78		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.21		su	1	07/17/18 15:00	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-4	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.57	0.57	mg/kg	1	07/18/18 12:12	RP	SW846 3060A/7196A
Redox Potential Vs H2	202		mv	1	07/17/18 15:11	RB	ASTM D1498-76M
Solids, Percent	69.7		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	9.43		su	1	07/17/18 15:20	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-5	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	07/18/18 12:12	RP	SW846 3060A/7196A
Redox Potential Vs H2	182		mv	1	07/17/18 15:23	RB	ASTM D1498-76M
Solids, Percent	71.3		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	9.33		su	1	07/17/18 15:27	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-6	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 73.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54	0.54	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	126		mv	1	07/17/18 15:33	RB	ASTM D1498-76M
Solids, Percent	73.5		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	10.12		su	1	07/17/18 15:29	RB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D2 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-7	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.50	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	172		mv	1	07/17/18 15:36	RB	ASTM D1498-76M
Solids, Percent	79.3		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	9.39		su	1	07/17/18 15:32	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-8	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 66.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.60	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	145		mv	1	07/17/18 15:37	RB	ASTM D1498-76M
Solids, Percent	66.6		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	6.79		su	1	07/17/18 15:35	RB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D2 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-9	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	223		mv	1	07/17/18 15:40	RB	ASTM D1498-76M
Solids, Percent	68		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	6.65		su	1	07/17/18 15:37	RB	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D2 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-10	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	62.8		mv	1	07/17/18 15:42	RB	ASTM D1498-76M
Solids, Percent	68.1		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	10.15		su	1	07/17/18 15:38	RB	SW846 9045D

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-D1 (0.0-0.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-11	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.43	0.41	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	243		mv	1	07/17/18 15:50	RB	ASTM D1498-76M
Solids, Percent	97.8		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	7.11		su	1	07/17/18 15:43	RB	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D1 (2.0-2.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-12	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 88.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.97	0.45	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	240		mv	1	07/17/18 15:53	RB	ASTM D1498-76M
Solids, Percent	88.7		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	7.66		su	1	07/17/18 15:45	RB	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D1 (4.0-4.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-13	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.46	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	242		mv	1	07/17/18 15:55	RB	ASTM D1498-76M
Solids, Percent	86.1		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.01		su	1	07/17/18 15:53	RB	SW846 9045D

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: SW-D1 (6.0-6.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-14	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.51	0.46	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	07/17/18 15:58	RB	ASTM D1498-76M
Solids, Percent	87.4		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.12		su	1	07/17/18 15:55	RB	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D1 (8.0-8.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-15	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	07/18/18 12:07	RP	SW846 3060A/7196A
Redox Potential Vs H2	287		mv	1	07/17/18 16:00	RB	ASTM D1498-76M
Solids, Percent	90.2		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.36		su	1	07/17/18 15:58	RB	SW846 9045D

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-D1 (10.0-10.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-16	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/18/18 13:03	RP	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	07/17/18 16:02	RB	ASTM D1498-76M
Solids, Percent	81.6		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.13		su	1	07/17/18 16:00	RB	SW846 9045D

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-D1 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-17	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	07/18/18 13:09	RP	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	07/17/18 16:05	RB	ASTM D1498-76M
Solids, Percent	87.9		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	8.22		su	1	07/17/18 16:02	RB	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D1 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-18	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76	0.50	mg/kg	1	07/18/18 13:09	RP	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	07/17/18 16:12	RB	ASTM D1498-76M
Solids, Percent	79.4		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	7.84		su	1	07/17/18 16:07	RB	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D1 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-19	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	07/18/18 13:09	RP	SW846 3060A/7196A
Redox Potential Vs H2	38.9		mv	1	07/17/18 16:20	RB	ASTM D1498-76M
Solids, Percent	71.5		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	10.40		su	1	07/17/18 16:12	RB	SW846 9045D

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-D1 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-20	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 56.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.71	mg/kg	1	07/18/18 13:09	RP	SW846 3060A/7196A
Redox Potential Vs H2	179		mv	1	07/17/18 16:23	RB	ASTM D1498-76M
Solids, Percent	56.3		%	1	07/17/18 14:20	LV	SM2540 G 18TH ED MOD
pH	6.54		su	1	07/17/18 16:13	RB	SW846 9045D

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-D1 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-21	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 55.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.72	mg/kg	1	07/18/18 13:09	RP	SW846 3060A/7196A
Redox Potential Vs H2	121		mv	1	07/18/18 10:29	RB	ASTM D1498-76M
Solids, Percent	55.9		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	7.01 J		su	1	07/18/18 10:11	RB	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-D6 (0.0-0.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-22	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59 J-	0.45	mg/kg	1	07/18/18 15:32	RP	SW846 3060A/7196A
Redox Potential Vs H2	269		mv	1	07/18/18 10:36	RB	ASTM D1498-76M
Solids, Percent	88.2		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	7.51 J		su	1	07/18/18 10:13	RB	SW846 9045D

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-D11 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-23	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9 J-	0.68	mg/kg	1	07/18/18 15:32	RP	SW846 3060A/7196A
Redox Potential Vs H2	176		mv	1	07/18/18 10:41	RB	ASTM D1498-76M
Solids, Percent	58.9		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.41 J		su	1	07/18/18 10:18	RB	SW846 9045D

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-D11 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-24	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.69 UJ-	0.69	mg/kg	1	07/18/18 15:32	RP	SW846 3060A/7196A
Redox Potential Vs H2	223		mv	1	07/18/18 10:43	RB	ASTM D1498-76M
Solids, Percent	58.3		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.55 J		su	1	07/18/18 10:27	RB	SW846 9045D

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: SW-D11 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-25	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.56	mg/kg	1	07/18/18 15:32	RP	SW846 3060A/7196A
Redox Potential Vs H2	192		mv	1	07/18/18 10:47	RB	ASTM D1498-76M
Solids, Percent	70.9		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.47 J		su	1	07/18/18 10:32	RB	SW846 9045D

RL = Reporting Limit

4.25
4

Report of Analysis

Client Sample ID: SW-D11 (14.0-14.5) Lab Sample ID: JC69982-26 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 68.5
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61 J-	0.58	mg/kg	1	07/18/18 15:32	RP	SW846 3060A/7196A
Redox Potential Vs H2	59.2		mv	1	07/18/18 10:50	RB	ASTM D1498-76M
Solids, Percent	68.5		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	10.27 J		su	1	07/18/18 10:35	RB	SW846 9045D

RL = Reporting Limit

4.26
4

Report of Analysis

Client Sample ID: SW-D11 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-27	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67 J-	0.52	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	88.3		mv	1	07/18/18 10:53	RB	ASTM D1498-76M
Solids, Percent	76.4		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	10.64 J		su	1	07/18/18 10:40	RB	SW846 9045D

RL = Reporting Limit

4.27
4

Report of Analysis

Client Sample ID: SW-D6 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-28	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.50	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	302		mv	1	07/18/18 11:02	RB	ASTM D1498-76M
Solids, Percent	80.6		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	7.46 J		su	1	07/18/18 10:42	RB	SW846 9045D

RL = Reporting Limit

4.28
4

Report of Analysis

Client Sample ID: SW-D6 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-29	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 60.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71 J-	0.66	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	210		mv	1	07/18/18 11:05	RB	ASTM D1498-76M
Solids, Percent	60.4		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.38 J		su	1	07/18/18 10:48	RB	SW846 9045D

RL = Reporting Limit

4.29
4

Report of Analysis

Client Sample ID: SW-D6 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-30	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.90 J-	0.54	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	216		mv	1	07/18/18 11:09	RB	ASTM D1498-76M
Solids, Percent	73.4		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	7.29 J		su	1	07/18/18 11:04	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-31	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	259		mv	1	07/18/18 11:11	RB	ASTM D1498-76M
Solids, Percent	75.5		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	8.01 J		su	1	07/18/18 11:08	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (10.0-10.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-32		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.1 J-	0.49	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	155		mv	1	07/18/18 11:13	RB	ASTM D1498-76M
Solids, Percent	80.9		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	9.72 J		su	1	07/18/18 11:11	RB	SW846 9045D

RL = Reporting Limit

4.32
4

Report of Analysis

Client Sample ID: SW-D5 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-33	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.87 J-	0.53	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	07/18/18 11:15	RB	ASTM D1498-76M
Solids, Percent	75.2		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.29 J		su	1	07/18/18 11:13	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (18.0-18.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-34		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55 J-	0.53	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	285		mv	1	07/18/18 11:16	RB	ASTM D1498-76M
Solids, Percent	75.1		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	6.53 J		su	1	07/18/18 11:14	RB	SW846 9045D

RL = Reporting Limit

4.34
4

Report of Analysis

Client Sample ID: SW-D5 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-35	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	07/18/18 15:18	RP	SW846 3060A/7196A
Redox Potential Vs H2	142		mv	1	07/18/18 11:19	RB	ASTM D1498-76M
Solids, Percent	71.6		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	5.92 J		su	1	07/18/18 11:16	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-36	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	155		mv	1	07/18/18 11:24	RB	ASTM D1498-76M
Solids, Percent	82.3		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	9.33 J		su	1	07/18/18 11:18	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-37	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	07/18/18 16:16	RP	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	07/18/18 12:22	RB	ASTM D1498-76M
Solids, Percent	79		%	1	07/17/18 14:38	LV	SM2540 G 18TH ED MOD
pH	7.36 J		su	1	07/18/18 11:19	RB	SW846 9045D

RL = Reporting Limit

4.37
4

Report of Analysis

Client Sample ID: FB(20180716)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-1A		Date Received: 07/16/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8146

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180716)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-1A		Date Received: 07/16/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/18/18 08:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D7 (10.0-10.5) Lab Sample ID: JC69982-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 83.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	37.6	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	69.4	5.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 2.5	2.5	mg/kg	2	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	53.4	6.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7 (10.0-10.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-2A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.8	1.7	mg/kg	1	07/18/18 12:12	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7 (12.0-12.5) Lab Sample ID: JC69982-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 78.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Chromium	20.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Nickel	4560	27	mg/kg	5	07/17/18	07/18/18	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Vanadium	20.2	6.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA44864
- (2) Instrument QC Batch: MA44873
- (3) Prep QC Batch: MP8144

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7 (12.0-12.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-3A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.7	1.8	mg/kg	1	07/18/18 12:12	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7 (14.0-14.5) Lab Sample ID: JC69982-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 69.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Chromium	30.7	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Nickel	398	5.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.8	2.8	mg/kg	2	07/17/18	07/18/18	ND SW846 6010D ²	SW846 3050B ³
Vanadium	38.6	7.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA44864
- (2) Instrument QC Batch: MA44873
- (3) Prep QC Batch: MP8144

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-4A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.7	2.0	mg/kg	1	07/18/18 12:12	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7 (16.0-16.5) Lab Sample ID: JC69982-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 71.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	605	5.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.2	6.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D7 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-5A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.4	2.0	mg/kg	1	07/18/18 12:12	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (18.0-18.5) Lab Sample ID: JC69982-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 73.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	21.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	885	5.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.8	6.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (18.0-18.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-6A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 73.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.4	1.9	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2 (14.0-14.5) Lab Sample ID: JC69982-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 79.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.7	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	44.8	5.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.8	6.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-7A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.0	1.8	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2 (16.0-16.5) Lab Sample ID: JC69982-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 66.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.3	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.3	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.9	7.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2 (16.0-16.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-8A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 66.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.7	2.0	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D2 (18.0-18.5) Lab Sample ID: JC69982-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 68.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.2	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.4	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.1	7.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-9A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.2	2.0	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-10A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.3	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	788	5.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.0	7.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-10A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.3	2.0	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (0.0-0.5) Lab Sample ID: JC69982-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 97.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	28.5	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	30.4	4.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	69.2	5.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D1 (0.0-0.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-11A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.1	1.5	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (2.0-2.5) Lab Sample ID: JC69982-12A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 88.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	78.3	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	26.1	4.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	36.3	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (2.0-2.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-12A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 88.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	77.3	1.7	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (4.0-4.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-13A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.7	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.1	4.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.2	5.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (4.0-4.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-13A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.7	1.7	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (6.0-6.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-14A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.0	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.9	4.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.5	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (6.0-6.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-14A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.5	1.7	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D1 (8.0-8.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-15A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.8	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	57.6	4.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.8	5.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (8.0-8.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-15A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.8	1.5	mg/kg	1	07/18/18 12:07	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (10.0-10.5) Lab Sample ID: JC69982-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 81.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	28.4	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	314	5.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.6	6.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (10.0-10.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-16A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.4	1.8	mg/kg	1	07/18/18 13:03	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (12.0-12.5) Lab Sample ID: JC69982-17A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 87.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	20.1	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	47.2	4.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	5.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D1 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-17A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.1	1.6	mg/kg	1	07/18/18 13:09	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D1 (14.0-14.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-18A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 79.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	43.5	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	49.3	5.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.0	6.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D1 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-18A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	42.7	1.7	mg/kg	1	07/18/18 13:09	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (16.0-16.5) Lab Sample ID: JC69982-19A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 71.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	29.2	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	830	5.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	6.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-D1 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-19A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.2	2.0	mg/kg	1	07/18/18 13:09	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (18.0-18.5) Lab Sample ID: JC69982-20A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 56.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.4 UJ-	3.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	21.2	1.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	22.6	6.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.7	1.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.6	8.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-D1 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-20A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 56.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.6	2.4	mg/kg	1	07/18/18 13:09	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-21A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 55.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.7 UJ-	3.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.4	1.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	120	7.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.9	1.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	9.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8144

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D1 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-21A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 55.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.8	2.6	mg/kg	1	07/18/18 13:09	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (0.0-0.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-22A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	28.4	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	96.1	4.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	46.2	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-D6 (0.0-0.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-22A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.8	1.7	mg/kg	1	07/18/18 15:32	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-D11 (20.0-20.5) Lab Sample ID: JC69982-23A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 58.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.3 UJ-	3.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.5	1.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.9	6.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.3	8.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-D11 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-23A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.6 J-	2.3	mg/kg	1	07/18/18 15:32	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-D11 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-24A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.6 UJ-	3.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.9	1.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	30.1	7.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.8	1.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	9.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (18.0-18.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-24A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 58.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.3	2.5	mg/kg	1	07/18/18 15:32	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: SW-D11 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-25A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	8.9	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	6.6	5.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	11.2	7.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-25A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.7 J-	2.0	mg/kg	1	07/18/18 15:32	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (14.0-14.5) Lab Sample ID: JC69982-26A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 68.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	244	5.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.7	7.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-26A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.26
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.7	2.0	mg/kg	1	07/18/18 15:32	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-27A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	457	5.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	6.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (12.0-12.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-27A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.27
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.3	1.8	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (20.0-20.5) Lab Sample ID: JC69982-28A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 80.6
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.5	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.2	4.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.4	5.9	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.28
4

Report of Analysis

Client Sample ID: SW-D6 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-28A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.3	1.7	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (18.0-18.5) Lab Sample ID: JC69982-29A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 60.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.5 UJ-	3.5	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.2	1.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	120	7.0	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.7	1.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	35.7	8.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.29
4

Report of Analysis

Client Sample ID: SW-D6 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-29A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 60.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.5	2.4	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (16.0-16.5) Lab Sample ID: JC69982-30A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 73.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10	5.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	6.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.30
4

Report of Analysis

Client Sample ID: SW-D6 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-30A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.30
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.5	1.9	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (14.0-14.5) Lab Sample ID: JC69982-31A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 75.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 28 UJ-	28	mg/kg	10	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Chromium ^a	19.3	14	mg/kg	10	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Nickel	12600	110	mg/kg	20	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	19.7	7.0	mg/kg	1	07/17/18	07/18/18 ND	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA44864
- (2) Instrument QC Batch: MA44873
- (3) Prep QC Batch: MP8145

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.31
4

Report of Analysis

Client Sample ID: SW-D6 (14.0-14.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-31A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 75.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.31
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.3	15	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (10.0-10.5) Lab Sample ID: JC69982-32A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 80.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 24 UJ-	24	mg/kg	10	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Chromium ^a	22.5	12	mg/kg	10	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Nickel	9940	97	mg/kg	20	07/17/18	07/18/18 ND	SW846 6010D ²	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	25.4	6.1	mg/kg	1	07/17/18	07/18/18 ND	SW846 6010D ¹	SW846 3050B ³

(1) Instrument QC Batch: MA44864

(2) Instrument QC Batch: MA44873

(3) Prep QC Batch: MP8145

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.32
4

Report of Analysis

Client Sample ID: SW-D6 (10.0-10.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-32A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4 J-	12	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (20.0-20.5) Lab Sample ID: JC69982-33A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 75.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	11.8	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.6	5.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.9	6.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-33A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.9	1.8	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (18.0-18.5) Lab Sample ID: JC69982-34A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 75.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	11.2	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	265	5.1	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	17.7	6.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.34
4

Report of Analysis

Client Sample ID: SW-D5 (18.0-18.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-34A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.34
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.7	1.8	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-35A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.8	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	5.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	6.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-35A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.8	2.0	mg/kg	1	07/18/18 15:18	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (14.0-14.5) Lab Sample ID: JC69982-36A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 82.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.5	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	231	4.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	5.8	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44864

(2) Prep QC Batch: MP8145

RL = Reporting Limit

4.36
4

Report of Analysis

Client Sample ID: SW-D5 (14.0-14.5)		Date Sampled: 07/16/18
Lab Sample ID: JC69982-36A		Date Received: 07/16/18
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.36
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.0	1.7	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (12.0-12.5) Lab Sample ID: JC69982-37A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/16/18 Date Received: 07/16/18 Percent Solids: 79.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Chromium	5.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Nickel	2270	16	mg/kg	3	07/17/18	07/18/18	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.3	1.3	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³
Vanadium	9.8	6.7	mg/kg	1	07/17/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA44864
- (2) Instrument QC Batch: MA44873
- (3) Prep QC Batch: MP8145

RL = Reporting Limit

4.37
4

Report of Analysis

Client Sample ID: SW-D6 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-37A	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	5.3	1.8	mg/kg	1	07/18/18 16:16	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.37
4

Report of Analysis

Client Sample ID: SW-D6 (0.0-0.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-22R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60	0.45	mg/kg	1	07/19/18 15:55	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-23R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81	0.68	mg/kg	1	07/19/18 15:55	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-24R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 58.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.69	mg/kg	1	07/19/18 15:55	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-25R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.56	mg/kg	1	07/19/18 15:55	RP	SW846 3066A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D11 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-26R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.58	0.58	mg/kg	1	07/19/18 15:55	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-27R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-28R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.50	mg/kg	1	07/19/18 17:05	RP	SW846-3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D6 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-29R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 60.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.66	0.66	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-30R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79	0.54	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-31R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6 (10.0-10.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-32R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.7	0.49	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7 (20.0-20.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-33R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.53	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (18.0-18.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-34R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.53	0.53	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (16.0-16.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-35R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.80	0.56	mg/kg	1	07/19/18 15:48	RP	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (14.0-14.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-36R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-D6 (12.0-12.5)	Date Sampled: 07/16/18
Lab Sample ID: JC69982-37R	Date Received: 07/16/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	07/19/18 17:05	RP	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC70061

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30419R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC70061 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20180717)	JC70061-1	Water	7/17/2018		X	X	X
SW-D11(0.0-0.5)	JC70061-2	Soil	7/17/2018		X	X	X
SW-D11(2.0-2.5)	JC70061-3	Soil	7/17/2018		X	X	X
SW-D11(4.0-4.5)	JC70061-4	Soil	7/17/2018		X	X	X
SW-D11(6.0-6.5)	JC70061-5	Soil	7/17/2018		X	X	X
SW-D11(8.0-8.5)	JC70061-6	Soil	7/17/2018		X	X	X
SW-D11(10.0-10.5)	JC70061-7	Soil	7/17/2018		X	X	X
SW-D5(0.0-0.5)	JC70061-8	Soil	7/17/2018		X	X	X
SW-D5(2.0-2.5)	JC70061-9	Soil	7/17/2018		X	X	X
SW-D5(4.0-4.5)	JC70061-10	Soil	7/17/2018		X	X	X
SW-D5(6.0-6.5)	JC70061-11	Soil	7/17/2018		X	X	X
SW-D5(8.0-8.5)	JC70061-12	Soil	7/17/2018		X	X	X
SW-D5(10.0-10.5)	JC70061-13	Soil	7/17/2018		X	X	X
SW-D5(12.0-12.5)	JC70061-14	Soil	7/17/2018		X	X	X
SW-D6(2.0-2.5)	JC70061-15	Soil	7/17/2018		X	X	X
SW-D6(4.0-4.5)	JC70061-16	Soil	7/17/2018		X	X	X
SW-D6(6.0-6.5)	JC70061-17	Soil	7/17/2018		X	X	X
SW-D6(8.0-8.5)	JC70061-18	Soil	7/17/2018		X	X	X
DUP-5(20180717)	JC70061-19	Soil	7/17/2018	SW-D6(4.0-4.5)	X	X	X
DUP-6(20180717)	JC70061-20	Soil	7/17/2018	SW-D6(6.0-6.5)	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All analytes associated with low-level calibration verification standard recoveries were within control limits.

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-D2(6.0-6.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D6(4.0-4.5)	Antimony	59.4%	56.7%
SW-D6(6.0-6.5)	Antimony	64.8%	63.4%
	Nickel	44.5%	< 30%

Notes:

AC = Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

DATA REVIEW REPORT

matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-D6(4.0-4.5) and SW-D6(6.0-6.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D6(4.0-4.5) / DUP-5(20180717)	Chromium	19.3	20.7	7.0%
	Trivalent Chromium	16.9	19.9	16.3%
	Nickel	276	521	61.5%
	Vanadium	25.2	26.5	AC
SW-D6(6.0-6.5) / DUP-6(20180717)	Chromium	19.9	19.5	2.0%
	Trivalent Chromium	18.2	18.2	0.0%
	Nickel	676	855	23.4%
	Vanadium	27.7	28.4	AC

Notes:

AC = Acceptable

The nickel results associated with samples locations SW-D6(4.0-4.5) and DUP-5(20180717) were not in agreement. The associated sample results were qualified as estimated.

The differences in the metals results between the parent sample SW-D6(6.0-6.5) and field duplicate sample DUP-6 (20180717) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample

DATA REVIEW REPORT

are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample locations SW-D6(4.0-4.5) and SW-D6(6.0-6.5) exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-D6(4.0-4.5) and SW-D6(6.0-6.5) in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

Spike recoveries were less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D6(4.0-4.5)	Hexavalent Chromium, Soluble	< 50%	< 50%
SW-D6(6.0-6.5)	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS/MSD must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

Spike recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
SW-D6(4.0-4.5)	Hexavalent Chromium	< 85%	< 85%
SW-D6(6.0-6.5)	Hexavalent Chromium	< 85%	< 85%

DATA REVIEW REPORT

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location SW-D6(6.0-6.5) exhibited results within the control limit.

All analytes associated with laboratory duplicate RPD were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes
SW-D6(4.0-4.5)	Hexavalent Chromium

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result \leq five times the RL	\pm RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D6(4.0-4.5) / DUP-5(20180717)	Hexavalent Chromium	2.4	0.82	NC
SW-D6(6.0-6.5) / DUP-6(20180717)	Hexavalent Chromium	1.7	1.3	AC

Notes:

AC = Acceptable

NC = Not compliant

The hexavalent chromium results associated with samples locations SW-D6(4.0-4.5) and DUP-5(20180717) were not in agreement. The associated sample results were qualified as estimated.

The difference in the hexavalent chromium results between the parent sample SW-D6(6.0-6.5) and field duplicate sample DUP-6 (20180717) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for redox potential and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample locations SW-D6(4.0-4.5) and SW-D6(6.0-6.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D6(4.0-4.5) / DUP-5(20180717)	Redox Potential	142	191	29.4%
	pH	10.62	10.29	3.2%
SW-D6(6.0-6.5) / DUP-6(20180717)	Redox Potential	54.3	95.6	55.1%
	pH	10.48	11.06	5.4%

The differences in the results between the parent sample SW-D6(4.0-4.5) and field duplicate sample DUP-5(20180717) were acceptable.

The redox potential results associated with samples locations SW-D6(6.0-6.5) and DUP-6(20180717) were not in agreement. The associated sample results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: August 29, 2018

PEER REVIEW: Dennis Capria

DATE: September 17, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FIB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusaa

FED-EX Tracking #	Bill of Lading #
SGS Quote #	SGS Job #
	LS-06818138
	JC70061

Client / Reporting Information		Project Information						Requested Analysis (see TEST CODE sheet)										Matrix Codes							
Company Name Arcadis		Project Name PP6 Jersey City Site 107																DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank							
Street Address 10 Friends Lane Suite 200 Jersey City NJ 07310		Street 18 Chapel Avenue Jersey City NJ		Billing Information (if different from Report to) Company Name																					
Project Contact Krista Mathewick Phone # 610.755.7080 Fax # 201.264.9065		Project # NPO00770.0001.00005		Street Address																					
Sampler(s) Name(s) Christina Cielli		Project Manager Jim McLaughlin		Attention:																					
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection			Number of preserved bottles										LAB USE ONLY									
			Date	Time	Sampled by	Matrix	# of bottles	HCl	Nash	HNO3	H2SO4	HNO2	D1 Water	MEDH	ENCORE		Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium		
1	FB(20180717)		7/17/18	0930	CC	SO	4																		
2	SW-D11(0.0-0.5)		7/17/18	0810	CC	SO	1																		A2
3	SW-D11(2.0-2.5)		7/17/18	0815	CC	SO	1																		G49
4	SW-D11(4.0-4.5)		7/17/18	0820	CC	SO	1																		D3
5	SW-D11(6.0-6.5)		7/17/18	0825	CC	SO	1																		
6	SW-D11(8.0-8.5)		7/17/18	0830	CC	SO	1																		
7	SW-D11(10.0-10.5)		7/17/18	0835	CC	SO	1																		
8	SW-D5(0.0-0.5)		7/17/18	0840	CC	SO	1																		
9	SW-D5(2.0-2.5)		7/17/18	0845	CC	SO	1																		
10	SW-D5(4.0-4.5)		7/17/18	0850	CC	SO	1																		
11	SW-D5(6.0-6.5)		7/17/18	0855	CC	SO	1																		

Turnaround Time (Business days)		Data Deliverable Information						Comments / Special Instructions									
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format Equi <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data									
Emergency & Rush T/A data available via LabLink								INITIAL ASSESSMENT <i>GCB</i> LABEL VERIFICATION _____ Sample inventory is verified upon receipt in the Laboratory									

Sample Custody must be documented below each time samples change possession, including courier delivery.							
1	Relinquished by Sampler: <i>GCB</i>	Date/Time: 7/17/18 1400	Received By: <i>S. Chan</i>	Date/Time: 7/17/18 200	Relinquished By: <i>S. Chan</i>	Date/Time: 7/17/18 1542	Received By: <i>[Signature]</i>
3	Relinquished by Sampler:	Date/Time:	Received By:	Date/Time:	Relinquished By:	Date/Time:	Received By:
5	Relinquished by:	Date/Time:	Received By:	Date/Time:	Custody Seal # 04734	<input type="checkbox"/> Intact Preserved where applicable <input type="checkbox"/> Not Intact	On Ice <input checked="" type="checkbox"/> Cooler Temp. <i>(10)</i>

5.2
5

3.2



SGS North America Inc. - Dayton
 2235 Route 130, Dayton, NJ 08810
 TEL 732-329-0200 FAX 732-329-3499
 www.sgs.com/ehsusua

FED-EX Tracking # _____ Bottle Order Control # _____
 SGS Quote # _____ SGS Job # **JC70061**

Client / Reporting Information			Project Information						Requested Analysis (see TEST CODE sheet)										Matrix Codes																
Company Name: ArCADIS			Project Name: PPG Jersey City Site 107 -						<div style="display: flex; justify-content: space-between;"> <div> <p>Total Chromium</p> <p>Hexavalent Chromium</p> <p>Trivalent Chromium</p> <p>Antimony</p> <p>Nickel</p> <p>Thallium</p> <p>Vanadium</p> </div> </div>										<p>DW - Drinking Water</p> <p>GW - Ground Water</p> <p>WW - Water</p> <p>SW - Surface Water</p> <p>SO - Soil</p> <p>SL - Sludge</p> <p>SED - Sediment</p> <p>LIQ - Other Liquid</p> <p>AIR - Air</p> <p>SOL - Other Solid</p> <p>WP - Wipe</p> <p>FB - Field Blank</p> <p>EB - Equipment Blank</p> <p>RB - Rinse Blank</p> <p>TB - Trip Blank</p>																
Street Address: 10 Friends Lane Suite 200			Street: 18 Chapel Avenue																																
City: Newton PA 18440			City: Jersey City NJ						Billing Information (if different from Report to)										LAB USE ONLY																
Project Contact: Krish Mastrocola			Project #: NPO00770.0001.00005						Company Name:																										
Phone #: 610.755.7080			Client Purchase Order #						Street Address:										Matrix Codes																
Sampler(s) Name(s): Christina C. Fell			Project Manager: Jim McLaughlin						City: _____ State: _____ Zip: _____																										
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection				Matrix	# of bottles	Number of preserved bottles																										
			Date	Time	Sampled by				HCl	NaOH	HNO3	HRSO4	HCN	D1 Water	MEOH	ENCORE																			
12	SW-D5(8.0-8.5)		7/17/18	0906	CC	SO	1														X	X	X	X	X	X	X								
13	SW-D5(10.0-10.5)		7/17/18	0905	CC	SO	1															X	X	X	X	X	X	X							
14	SW-D5(12.0-12.5)		7/17/18	0910	CC	SO	1															X	X	X	X	X	X	X							
15	SW-D6(2.0-2.5)		7/17/18	0915	CC	SO	1															X	X	X	X	X	X	X							
16	SW-D6(4.0-4.5)		7/17/18	0920	CC	SO	1															X	X	X	X	X	X	X							
17	SW-D6(6.0-6.5)		7/17/18	0925	CC	SO	1															X	X	X	X	X	X	X							
18	SW-D6(8.0-8.5)		7/17/18	0935	CC	SO	1															X	X	X	X	X	X	X							
19	DUP-5 (20180707)		7/17/18	-	CC	SO	1															X	X	X	X	X	X	X							
20	DUP-6 (20180717)		7/17/18	-	CC	SO	1															X	X	X	X	X	X	X							
Turnaround Time (Business days)			Data Deliverable Information						Comments / Special Instructions																										
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____			Approved by (SGS Project Manager)/Date: _____						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format Equis <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										Sample inventory is verified upon receipt in the Laboratory																
Emergency & Rush T/A data available via LabLink			Sample Custody must be documented below each time samples change possession, including courier delivery.																																
Relinquished by: CF		Date Time: 7/17/18 1400		Received By: JSCHAW		Date Time: 7/17/18 200		Relinquished by: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18		Received By: JSCHAW		Date Time: 7/17/18	
Relinquished by:			Date Time:			Received By:			Custody Seal # 04734			<input type="checkbox"/> Intact <input type="checkbox"/> Not intact			Preserved where applicable			<input checked="" type="checkbox"/> On Ice <input type="checkbox"/> Coolers Temp: CTP																	

5.2 5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsus

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC 70061

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Lab Sample #, Field ID / Point of Collection, Date, Time, Sampled by, Matrix, # of bottles, HCl, NaOH, HNO3, H2SO4, HClO4, H2O2, DI Water, MEOH, ENCORE, Turnaround Time, Approved by, Data Deliverable Information, Comments / Special Instructions, Relinquished by, Date Time, Received By, Date Time, Custody Seal #, Intact, Not intact, Preserved where applicable, Do Ice, Cooler Temp.

5.2
5



Report of Analysis

Client Sample ID: FB(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-1	Date Received: 07/17/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/18/18 09:28	RP	SW846 7196A
Redox Potential Vs H2	350		mv	1	07/18/18 16:14	RB	ASTM D1498-76
pH ^a	5.57		su	1	07/17/18 16:45	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D11(0.0-0.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-2	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56 J-	0.43	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	225		mv	1	07/18/18 13:06	RB	ASTM D1498-76M
Solids, Percent	92.8		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.32		su	1	07/18/18 12:59	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D11(2.0-2.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-3	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.44	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	283		mv	1	07/18/18 13:10	RB	ASTM D1498-76M
Solids, Percent	89.9		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.36		su	1	07/18/18 13:04	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D11(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-4	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74 J-	0.47	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	07/18/18 13:12	RB	ASTM D1498-76M
Solids, Percent	84.6		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.85		su	1	07/18/18 13:08	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D11(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-5	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63 J-	0.45	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	318		mv	1	07/18/18 13:15	RB	ASTM D1498-76M
Solids, Percent	88.6		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.57		su	1	07/18/18 13:11	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-6	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.62	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	172		mv	1	07/18/18 13:22	RB	ASTM D1498-76M
Solids, Percent	64.5		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	6.99		su	1	07/18/18 13:13	RB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D11(10.0-10.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-7	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99 J-	0.50	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	227		mv	1	07/18/18 13:27	RB	ASTM D1498-76M
Solids, Percent	80.8		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	8.60		su	1	07/18/18 13:19	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D5(0.0-0.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-8	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67 J-	0.42	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	293		mv	1	07/18/18 13:32	RB	ASTM D1498-76M
Solids, Percent	96.2		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.75		su	1	07/18/18 13:22	RB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D5(2.0-2.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-9		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52 J-	0.45	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	287		mv	1	07/18/18 13:33	RB	ASTM D1498-76M
Solids, Percent	89.8		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.88		su	1	07/18/18 13:25	RB	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D5(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-10	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81 J-	0.46	mg/kg	1	07/19/18 11:56	RP	SW846 3060A/7196A
Redox Potential Vs H2	202		mv	1	07/18/18 14:48	RB	ASTM D1498-76M
Solids, Percent	86.3		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.66		su	1	07/18/18 14:30	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-11	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.48	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	309		mv	1	07/18/18 14:51	RB	ASTM D1498-76M
Solids, Percent	82.5		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	10.00		su	1	07/18/18 14:38	RB	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D5(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-12	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1 J-	0.49	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	172		mv	1	07/18/18 15:11	RB	ASTM D1498-76M
Solids, Percent	81.5		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	9.57		su	1	07/18/18 14:41	RB	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D5(10.0-10.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-13	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	195		mv	1	07/18/18 15:22	RB	ASTM D1498-76M
Solids, Percent	80.7		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.77		su	1	07/18/18 14:50	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(12.0-12.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-14		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.72 J-	0.48	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	254		mv	1	07/18/18 15:26	RB	ASTM D1498-76M
Solids, Percent	82.6		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	7.78		su	1	07/18/18 15:10	RB	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D6(2.0-2.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-15	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 J-	0.49	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	375		mv	1	07/18/18 15:43	RB	ASTM D1498-76M
Solids, Percent	81.2		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	11.73		su	1	07/18/18 15:19	RB	SW846 9045D

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-D6(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-16	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 J-	0.50	mg/kg	1	07/19/18 11:43	RP	SW846 3060A/7196A
Redox Potential Vs H2	142		mv	1	07/18/18 12:59	RB	ASTM D1498-76M
Solids, Percent	80		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	10.62		su	1	07/18/18 12:53	RB	SW846 9045D

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-D6(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-17	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.49	mg/kg	1	07/19/18 16:47	DC	SW846 3060A/7196A
Redox Potential Vs H2	54.3 J		mv	1	07/18/18 15:45	RB	ASTM D1498-76M
Solids, Percent	81.5		%	1	07/18/18 14:20	LV	SM2540 G 18TH ED MOD
pH	10.48		su	1	07/18/18 15:22	RB	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D6(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-18	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52 J-	0.49	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	07/18/18 15:47	RB	ASTM D1498-76M
Solids, Percent	82.2		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	10.18		su	1	07/18/18 15:27	RB	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: DUP-5(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-19	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82 J-	0.47	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	191		mv	1	07/18/18 15:56	RB	ASTM D1498-76M
Solids, Percent	84.6		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	10.29		su	1	07/18/18 15:34	RB	SW846 9045D

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: DUP-6(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-20	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.48	mg/kg	1	07/19/18 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	95.6 J		mv	1	07/18/18 16:01	RB	ASTM D1498-76M
Solids, Percent	84		%	1	07/18/18 14:35	LV	SM2540 G 18TH ED MOD
pH	11.06		su	1	07/18/18 15:49	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180717)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-1A		Date Received: 07/17/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/18/18	07/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/18/18	07/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/18/18	07/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/18/18	07/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/18/18	07/19/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44875

(2) Prep QC Batch: MP8152

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-1A	Date Received: 07/17/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/19/18 00:18	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D11(0.0-0.5) Lab Sample ID: JC70061-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 92.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.7	4.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.2	5.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D11(0.0-0.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-2A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.5	1.5	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D11(2.0-2.5) Lab Sample ID: JC70061-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 89.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.5	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	41.8	4.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	49.7	5.6	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D11(2.0-2.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-3A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.3	1.5	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D11(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-4A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.8	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	98.4	4.6	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.1	5.8	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D11(4.0-4.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-4A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.1	1.7	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D11(6.0-6.5) Lab Sample ID: JC70061-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 88.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	20.3	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	73.8	4.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	5.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D11(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-5A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.7	1.6	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-6A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0 UJ-	3.0	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.9	1.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	183	5.9	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.6	7.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-6A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.2	2.1	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(10.0-10.5) Lab Sample ID: JC70061-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 80.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.0	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	900	4.9	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.8	6.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D11(10.0-10.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-7A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.7	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D5(0.0-0.5) Lab Sample ID: JC70061-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 96.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	37.5	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	60.2	4.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	92.1	5.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(0.0-0.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-8A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.8	1.5	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D5(2.0-2.5) Lab Sample ID: JC70061-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 89.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.9	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.5	4.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	5.7	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(2.0-2.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-9A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.4	1.6	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(4.0-4.5) Lab Sample ID: JC70061-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 86.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	21.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	58.8	4.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	5.7	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-10A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.3	1.6	mg/kg	1	07/19/18 11:56	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(6.0-6.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-11A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.9	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	257	4.8	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.9	6.0	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D5(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-11A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.7	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(8.0-8.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-12A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	20.5	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	287	4.8	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.5	6.0	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D5(8.0-8.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-12A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.4 J-	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(10.0-10.5) Lab Sample ID: JC70061-13A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 80.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 83 UJ-	83	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	672	41	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	1990	170	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 41	41	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	672	210	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(10.0-10.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-13A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	672	42	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(12.0-12.5) Lab Sample ID: JC70061-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 82.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	6.4	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	446	4.8	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	11.1	6.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D5(12.0-12.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-14A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	5.7 J-	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-D6(2.0-2.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-15A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.9	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	84.0	4.9	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.5	6.1	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(2.0-2.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-15A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.0	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(4.0-4.5) Lab Sample ID: JC70061-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 80.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.3	1.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	276 J	5.0	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.2	6.3	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-16A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.9 J-	1.8	mg/kg	1	07/19/18 11:43	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(6.0-6.5) Lab Sample ID: JC70061-17A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 81.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.9	1.2	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	676 J-	4.9	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.7	6.1	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44885

(2) Prep QC Batch: MP8150

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D6(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-17A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.2	1.7	mg/kg	1	07/19/18 16:47	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-D6(8.0-8.5) Lab Sample ID: JC70061-18A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 82.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.4	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	60.3	4.8	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	6.0	mg/kg	1	07/18/18	07/18/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44874

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-D6(8.0-8.5)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-18A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.18
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.9	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-5(20180717) Lab Sample ID: JC70061-19A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 84.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	20.7	1.2	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	521 J	4.7	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.5	5.9	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44875

(2) Prep QC Batch: MP8151

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-5(20180717)		Date Sampled: 07/17/18
Lab Sample ID: JC70061-19A		Date Received: 07/17/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.19
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.9	1.7	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-6(20180717) Lab Sample ID: JC70061-20A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/18 Date Received: 07/17/18 Percent Solids: 84.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.5	1.1	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	855	4.6	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	28.4	5.7	mg/kg	1	07/18/18	07/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44875

(2) Prep QC Batch: MP8151

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: DUP-6(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-20A	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.2	1.6	mg/kg	1	07/19/18 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(0.0-0.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-2R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D11(2.0-2.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-3R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-4R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-5R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D11(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-6R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.62	0.62	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D11(10.0-10.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-7R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(0.0-0.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-8R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64	0.42	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D5(2.0-2.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-9R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50	0.45	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-10R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	07/23/18 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(4.0-4.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-16R	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	07/23/18 12:28	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-11T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D5(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-12T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D5(10.0-10.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-13T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5(12.0-12.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-14T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D6(2.0-2.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-15T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(6.0-6.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-17T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/23/18 15:08	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D6(8.0-8.5)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-18T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-5(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-19T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	07/23/18 15:18	RI	SW846 3066A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-6(20180717)	Date Sampled: 07/17/18
Lab Sample ID: JC70061-20T	Date Received: 07/17/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	07/23/18 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC69017, JC69227, and JC69374

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30550R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC69017, JC69227, and JC69374 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC69017	FB (20180629)	JC69017-1	Water	6/29/2018		X	X	X
	SW-A1 (0.0-0.5)	JC69017-2	Soil	6/29/2018		X	X	X
	SW-A1- (2.0-2.5)	JC69017-3	Soil	6/29/2018		X	X	X
	SW-A1 (4.0-4.5)	JC69017-4	Soil	6/29/2018		X	X	X
JC69227	FB (20180703)	JC69227-1	Water	7/3/2018		X	X	X
	SW-A2 (4.0-4.5)	JC69227-2	Soil	7/3/2018		X	X	X
	SW-A2 (2.0-2.5)	JC69227-3	Soil	7/3/2018		X	X	X
	SW-A2 (0.0-0.5)	JC69227-4	Soil	7/3/2018		X	X	X
JC69374	FB (20180706)	JC69374-1	Water	7/6/2018		X	X	X
	SW-A3 (0.0-0.5)	JC69374-2	Soil	7/6/2018		X	X	X
	SW-A3 (2.0-2.5)	JC69374-3	Soil	7/6/2018		X	X	X
	SW-A3 (4.0-4.5)	JC69374-4	Soil	7/6/2018		X	X	X
	SW-A4 (0.0-0.5)	JC69374-5	Soil	7/6/2018		X	X	X
	SW-A4 (2.0-2.5)	JC69374-6	Soil	7/6/2018		X	X	X
	SW-A4 (4.0-4.5)	JC69374-7	Soil	7/6/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC69017 and JC69374: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC69227: The MS/MSD analysis performed on sample location SW-A2 (4.0-4.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A2 (4.0-4.5)	Antimony	65.7%	67.1%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC69017 and JC69374: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC69227: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A2 (4.0-4.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC69017 and JC69374: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC69227: The serial dilution performed on sample location SW-A2 (4.0-4.5) exhibited %D within control limits.

8. System Performance and Overall Assessment

SDG #JC69017: The thallium result in sample SW-A1 (2.0-2.5) was reported as non-detected at an elevated reporting limit of 2.3mg/kg. The sample required dilution due to an interfering element.

SDG #JC69374: The thallium result in sample SW-A3 (0.0-0.5) was reported as non-detected at an elevated reporting limit of 2.1mg/kg. The sample required dilution due to an interfering element.

SDG #JC69374: The thallium result in sample SW-A4 (0.0-0.5) was reported as non-detected at an elevated reporting limit of 2.5mg/kg. The sample required dilution due to an interfering element.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC69017 and JC69227: The MS analysis performed on sample locations SW-A1 (0.0-0.5) and SW-A2 (4.0-4.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC69374: The MS analysis performed on sample location SW-A3 (0.0-0.5) exhibited an acceptable insoluble hexavalent chromium recovery. The soluble hexavalent chromium spike recovery was less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A3 (0.0-0.5)	Hexavalent Chromium, Soluble	55.5%	--
SW-A3 (2.0-2.5)	Hexavalent Chromium, Soluble	--	AC (95%)

Notes:

AC Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

Since the MS analysis associated with the reanalysis of the samples was performed using a different sample than the original analysis, the results from the original analysis of the samples are usable with appropriate qualification. No sample results were rejected. In addition, the trivalent chromium results in samples SW-A3 (4.0-4.5) and SW-A4 (0.0-0.5) were also qualified since the hexavalent chromium result was greater than 10% of the total chromium concentration.

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC69017, JC69227, and JC69374: The PDS analysis performed on sample locations SW-A1 (0.0-0.5), SW-A2 (4.0-4.5), and SW-A3 (0.0-0.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC69017, JC69227, and JC69374: The laboratory duplicate analysis performed on sample locations SW-A1 (0.0-0.5), SW-A2 (4.0-4.5), and SW-A3 (0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

SDG #JC69374: All samples were analyzed within the specified holding times.

SDGs #JC69017 and JC69227: The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A1 (0.0-0.5) SW-A1- (2.0-2.5) SW-A1 (4.0-4.5) SW-A2 (4.0-4.5) SW-A2 (2.0-2.5) SW-A2 (0.0-0.5)	SW846 9045D	Analysis: 3 days	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification
	Detected Analytes
Analysis completed greater than two times holding time	J

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The

DATA REVIEW REPORT

BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC69017 and JC69227: The laboratory duplicate analysis performed on sample location FB (20180629), FB (20180703), and SW-A2 (2.0-2.5) exhibited results within the control limit.

SDG #JC69374: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: September 5, 2018

PEER REVIEW: Dennis Capria

DATE: October 8, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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FB
902

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

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CR

FED-EX Tracking # _____ Bottle Order Control # _____
SGS Quote # _____ SGS Job # **JC69017**

Client/Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes																																																																																				
Company Name Aracelis		Project Name: PPG Jersey City Site 107				<table border="1"> <tr><td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium															X	X	X	X	X	X	X															X	X	X	X	X	X	X															X	X	X	X	X	X	X															DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium											Vanadium																																																																																				
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Project Contact Krista Malyszka		Project # NP000770.0001.00005		Street Address																																																																																																
Phone # 610.755.7080		Client Purchase Order #		City, State, Zip																																																																																																
Sampler(s) Name(s) Christina Cifelli		Phone # 201.261.8005		Project Manager Jim McLaughlin		Attention:																																																																																														
Lab Sample #	Field ID / Point of Collection	MEOH/DI/Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY																																																																																		
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2	SW-A1(0.0-0.5)		6/29/18	0945	CC	SO	1																C54																																																																													
3	SW-A1(2.0-2.5)		6/29/18	0950	CC	SO	1																D52																																																																													
4	SW-A1(4.0-4.5)		6/29/18	0955	CC	SO	1																CRUSH																																																																													

5.2
5

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Equip <input type="checkbox"/> Other			
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results + QC Summary; Commercial "B" = Results + QC Summary				Sample inventory is verified upon receipt in the Laboratory					

Relinquished by Sampler: [Signature]				Received By: 1 Robert Chambers				Date Time: 6/29/18 1300			
Relinquished by Sampler: [Signature]				Received By: 2 Robert Chambers				Date Time: 6/29/18 1644			
Relinquished by Sampler: [Signature]				Received By: 3 [Signature]				Date Time: 6/29/18			
Relinquished by Sampler: [Signature]				Received By: 4 [Signature]				Date Time: 6/29/18			
Custody Seal: 09644				Intact: <input checked="" type="checkbox"/> Not intact: <input type="checkbox"/>				Preserved where applicable: <input type="checkbox"/>			
				On Ice: <input type="checkbox"/> Cooler Temp: N.T.P. 3.2 OC							

Form SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.



Report of Analysis

Client Sample ID: FB (20180629)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-1	Date Received: 06/29/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/29/18 20:10	LS	SW846 7196A
Redox Potential Vs H2	345		mv	1	07/02/18 15:40	RB	ASTM D1498-76
pH ^a	4.78		su	1	06/29/18 17:15	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A1 (0.0-0.5)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-2	Date Received: 06/29/18
Matrix: SO - Solid	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.3	0.43	mg/kg	1	07/02/18 17:41	DC	SW846 3060A/7196A
Redox Potential Vs H2	129		mv	1	07/02/18 12:10	RB	ASTM D1498-76M
Solids, Percent	92.5		%	1	07/02/18 09:50	RC	SM2540 G 18TH ED MOD
pH	11.70 J		su	1	07/02/18 12:29	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A1 (2.0-2.5)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-3	Date Received: 06/29/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.4	0.48	mg/kg	1	07/02/18 17:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	364		mv	1	07/02/18 12:22	RB	ASTM D1498-76M
Solids, Percent	84.1		%	1	07/02/18 09:50	RC	SM2540 G 18TH ED MOD
pH	7.62 J		su	1	07/02/18 12:34	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A1 (4.0-4.5)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-4	Date Received: 06/29/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.1	0.46	mg/kg	1	07/02/18 17:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	362		mv	1	07/02/18 12:23	RB	ASTM D1498-76M
Solids, Percent	86.5		%	1	07/02/18 09:50	RC	SM2540 G 18TH ED MOD
pH	7.35 J		su	1	07/02/18 12:34	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180629) Lab Sample ID: JC69017-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/29/18 Date Received: 06/29/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/30/18	07/01/18	GT SW846 6010C ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/30/18	07/01/18	GT SW846 6010C ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/30/18	07/01/18	GT SW846 6010C ¹	SW846 3010A ²
Thallium	< 2.0	2.0	ug/l	1	06/30/18	07/01/18	GT SW846 6010C ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/30/18	07/01/18	GT SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44749

(2) Prep QC Batch: MP7902

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180629)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-1A	Date Received: 06/29/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/01/18 07:08	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A1 (0.0-0.5) Lab Sample ID: JC69017-2A Matrix: SO - Solid Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/29/18 Date Received: 06/29/18 Percent Solids: 92.5
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	39.7	1.0	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	17.3	4.2	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	26.6	5.2	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44759

(2) Prep QC Batch: MP7904

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A1 (0.0-0.5)		Date Sampled: 06/29/18
Lab Sample ID: JC69017-2A		Date Received: 06/29/18
Matrix: SO - Solid		Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.4	1.4	mg/kg	1	07/02/18 21:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A1 (2.0-2.5) Lab Sample ID: JC69017-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/29/18 Date Received: 06/29/18 Percent Solids: 84.1
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ³
Chromium	30.9	1.2	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ³
Nickel	13.3	4.7	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ³
Thallium ^a	< 2.3	2.3	mg/kg	2	06/30/18	07/03/18	MET	SW846 6010D ² SW846 3050B ³
Vanadium	16.5	5.8	mg/kg	1	06/30/18	07/02/18	ND	SW846 6010D ¹ SW846 3050B ³

- (1) Instrument QC Batch: MA44759
- (2) Instrument QC Batch: MA44764
- (3) Prep QC Batch: MP7904

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A1 (2.0-2.5)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-3A	Date Received: 06/29/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.5	1.7	mg/kg	1	07/02/18 21:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A1 (4.0-4.5)	Date Sampled: 06/29/18
Lab Sample ID: JC69017-4A	Date Received: 06/29/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/30/18	07/02/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	35.6	1.1	mg/kg	1	06/30/18	07/02/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.4	4.4	mg/kg	1	06/30/18	07/02/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/30/18	07/02/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.5	mg/kg	1	06/30/18	07/02/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44759

(2) Prep QC Batch: MP7904

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A1 (4.0-4.5)		Date Sampled: 06/29/18
Lab Sample ID: JC69017-4A		Date Received: 06/29/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.5	1.6	mg/kg	1	07/02/18 21:13	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC69227

Client Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes																																																
Company Name Acadus		Project Name PPG Jersey City Site 107		<table border="1"> <tr><td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium						X	X	X	X	X	X	X						X	X	X	X	X	X	X						X	X	X	X	X	X	X						DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony											Nickel	Thallium	Vanadium																																														
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X	X	X	X											X	X	X																																														
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Street Address 10 Friends Lane Suite 200		Street 18 Chapel Avenue																																																												
City State Zip Newtown PA 18440		City State Jersey City N.J.																																																												
Project Contact Krista Mashkocala		Billing Information (if different from Report to) Company Name																																																												
Phone # 610.755.7080		Project # NP000770.0001.00005																																																												
Sampler(s) Name(s) Christin Picelli		Project Manager Jim McLaughlin																																																												
Lab Sample #		Field ID / Point of Collection		MEQ/MDI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles										LAB USE ONLY																																				
1		FB(20180703)				7/3/18		0800		CC		FB		4		HCl, HNO3, H2SO4, DI Water, MEQ/MDI, ENCORE										A25																																				
2		SW-A2(4.0-4.5)				7/3/18		0710		CC		SO		1												G53																																				
3		SW-A2(2.0-2.5)				7/3/18		0720		CC		SO		1												D60																																				
4		SW-A2(0.0-0.5)				7/3/18		0730		CC		SO		1																																																

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information										Comments / Special Instructions
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input checked="" type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Equis <input type="checkbox"/> Other										INITIAL ASSESSMENT JA LABEL VERIFICATION Sample inventory is verified upon receipt in the Laboratory

Emergency & Rush T/A data available via LabLink												Sample Custody must be documented below each time samples change possession, including courier delivery.											
Relinquished by Sampler:		Date Time:		Received By:		Date Time:		Relinquished by:		Date Time:		Received By:		Date Time:		Received By:							
1 JA		7/2/18 1555		1 P. Shah		7/3/18 1742		2 P. Shah		7/3/18 1742		4 JA		7/3/18 1742		4 JA							
3				3				4				4				4							
Relinquished by:		Date Time:		Received By:		Date Time:		Custody Seal:		Intact/Not Intact:		Preserved where applicable:		On Ice:		Cooler Temp:							
								04248		Intact				X		3.6 C							

5.2
5



Report of Analysis

Client Sample ID: FB (20180703)	Date Sampled: 07/03/18
Lab Sample ID: JC69227-1	Date Received: 07/03/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010	0.010	mg/l	1	07/03/18 22:26	LS	SW846 7196A
Redox Potential Vs H2 ^a	564		mv	1	07/06/18 10:58	HS	ASTM D1498-76
pH ^b	5.09		su	1	07/03/18 18:07	SUB	SM4500H+ B-11

- (a) Sample received outside the holding time.
- (b) Sample received out of holding time for pH analysis.

RL = Reporting Limit



Report of Analysis

Client Sample ID: SW-A2 (4.0-4.5) Lab Sample ID: JC69227-2 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/03/18 Date Received: 07/03/18 Percent Solids: 90.1
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	18.5	0.44	mg/kg	1	07/06/18 12:25	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	493		mv	1	07/06/18 11:38	HS	ASTM D1498-76M
Solids, Percent	90.1		%	1	07/06/18 09:33	RP	SM2540 G 18TH ED MOD
pH	6.09 J		su	1	07/06/18 10:41	HS	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A2 (2.0-2.5) Lab Sample ID: JC69227-3 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/03/18 Date Received: 07/03/18 Percent Solids: 83.5
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.48	mg/kg	1	07/06/18 12:33	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	540		mv	1	07/06/18 11:41	HS	ASTM D1498-76M
Solids, Percent	83.5		%	1	07/06/18 09:33	RP	SM2540 G 18TH ED MOD
pH	5.26 J		su	1	07/06/18 10:44	HS	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A2 (0.0-0.5)	Date Sampled: 07/03/18
Lab Sample ID: JC69227-4	Date Received: 07/03/18
Matrix: SO - Soil	Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	16.8	0.45	mg/kg	1	07/06/18 12:33	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	192		mv	1	07/06/18 11:45	HS	ASTM D1498-76M
Solids, Percent	89.5		%	1	07/06/18 09:33	RP	SM2540 G 18TH ED MOD
pH	11.46 J		su	1	07/06/18 10:47	HS	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180703) Lab Sample ID: JC69227-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/03/18 Date Received: 07/03/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 6.0	6.0	ug/l	1	07/05/18	07/06/18	ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/05/18	07/06/18	ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/05/18	07/06/18	ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/05/18	07/06/18	ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/05/18	07/06/18	ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44786

(2) Prep QC Batch: MP7967

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180703) Lab Sample ID: JC69227-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/03/18 Date Received: 07/03/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/06/18 12:04	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A2 (4.04.55) Lab Sample ID: JC69227-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/03/18 Date Received: 07/03/18 Percent Solids: 90.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ	2.2	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	37.2	1.1	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.0	4.4	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.2	5.4	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44777

(2) Prep QC Batch: MP7977

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A2 (4.04.55)		Date Sampled: 06/03/18
Lab Sample ID: JC69227-2A		Date Received: 07/03/18
Matrix: SO - Soil		Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.7	1.5	mg/kg	1	07/06/18 12:25	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A2 (2.0-2.5)	Date Sampled: 06/03/18
Lab Sample ID: JC69227-3A	Date Received: 07/03/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.1	1.2	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	4.7	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	29.6	5.8	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44777

(2) Prep QC Batch: MP7977

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A2 (2.0-2.5)		Date Sampled: 06/03/18
Lab Sample ID: JC69227-3A		Date Received: 07/03/18
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.7	1.7	mg/kg	1	07/06/18 12:33	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A2 (0.0-0.5) Lab Sample ID: JC69227-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/03/18 Date Received: 07/03/18 Percent Solids: 89.5
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ	2.2	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	45.0	1.1	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.5	4.5	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	16.1	5.6	mg/kg	1	07/05/18	07/06/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44777

(2) Prep QC Batch: MP7977

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A2 (0.0-0.5)		Date Sampled: 06/03/18
Lab Sample ID: JC69227-4A		Date Received: 07/03/18
Matrix: SO - Soil		Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.2	1.6	mg/kg	1	07/06/18 12:33	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

FD-52 Tracking # FD-06818-138 Bottle Order Control # LD-06818-1
SGS Quote # JC69374 SGS Job # JC69374

Client Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Code																																																																																																																																												
Company Name Arcaadis		Project Name PPG Jersey City Site 107				<table border="1"> <tr><td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium														X	X	X	X	X	X	X														X	X	X	X	X	X	X														X	X	X	X	X	X	X														X	X	X	X	X	X	X														X	X	X	X	X	X	X														X	X	X	X	X	X	X														DW - Drinking W GW - Ground W WW - Waste SW - Surface W SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liq AIR - Air SOL - Other Sr WP - Wipe FB - Field Blank EB - Equipment Bl RB - Rinse Blr TB - Trip Blank
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Project Contact Krista Masbouda		E-mail		Street Address																																																																																																																																																								
Phone # 610.755.7080		Fax #		Client Purchase Order #																																																																																																																																																								
Sample(s) Name(s) Christin Cifelli		Phone # 201.464.6457		Project Manager Jim McLaughlin																																																																																																																																																								
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Lab Sample #	Field ID / Point of Collection	MECH/DI Vis #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	H2O2	NONE	DI Water	MECH	ENCORE	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	Matrix Code																																																																																																																																				
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Form:SM088-03C (revised 2/12/18)

JC69374: Chain of Custody

Page 1 of 3



5.2
5

Report of Analysis

Client Sample ID: FB (20180706) Lab Sample ID: JC69374-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/06/18 18:40	LS	SW846 7196A
Redox Potential Vs H2	549		mv	1	07/07/18 10:28	AC	ASTM D1498-76
pH ^a	6.83		su	1	07/06/18 16:55	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A3 (0.0-0.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-2	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.42	mg/kg	1	07/10/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	07/07/18 13:35	AC	ASTM D1498-76M
Solids, Percent	96.3		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	7.85		su	1	07/07/18 12:01	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A3 (2.0-2.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-3	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.72 J-	0.48	mg/kg	1	07/10/18 14:13	DC	SW846 3060A/7196A
Redox Potential Vs H2	382		mv	1	07/07/18 13:42	AC	ASTM D1498-76M
Solids, Percent	82.9		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	6.10		su	1	07/07/18 13:08	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A3 (4.0-4.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-4	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.6 J-	0.43	mg/kg	1	07/10/18 14:13	DC	SW846 3060A/7196A
Redox Potential Vs H2	366		mv	1	07/07/18 13:49	AC	ASTM D1498-76M
Solids, Percent	92.5		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	6.72		su	1	07/07/18 13:21	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A4 (0.0-0.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-5		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.5 J-	0.48	mg/kg	1	07/10/18 14:13	DC	SW846 3060A/7196A
Redox Potential Vs H2	399		mv	1	07/07/18 13:53	AC	ASTM D1498-76M
Solids, Percent	84.2		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	6.67		su	1	07/07/18 13:26	AC	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A4 (2.0-2.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-6	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66 J-	0.47	mg/kg	1	07/10/18 14:13	DC	SW846 3060A/7196A
Redox Potential Vs H2	453		mv	1	07/07/18 13:56	AC	ASTM D1498-76M
Solids, Percent	84.9		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	4.78		su	1	07/07/18 13:30	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (4.0-4.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-7		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.8 J-	0.54	mg/kg	1	07/10/18 14:13	DC	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	07/07/18 14:06	AC	ASTM D1498-76M
Solids, Percent	73.9		%	1	07/07/18 08:20	LV	SM2540 G 18TH ED MOD
pH	6.81		su	1	07/07/18 13:35	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB (20180706) Lab Sample ID: JC69374-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44799

(2) Prep QC Batch: MP7995

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180706) Lab Sample ID: JC69374-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/09/18 19:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A3 (0.0-0.5) Lab Sample ID: JC69374-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: 96.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	42.2	1.0	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.2	4.1	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.1	2.1	mg/kg	2	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	37.1	5.1	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44798

(2) Prep QC Batch: MP7999

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A3 (0.0-0.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-2A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	40.9	1.4	mg/kg	1	07/10/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A3 (2.0-2.5) Lab Sample ID: JC69374-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: 82.9
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ³
Chromium	17.9	1.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ³
Nickel	10.5	4.7	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ³
Thallium	< 2.3	2.3	mg/kg	2	07/07/18	07/09/18	ND SW846 6010D ²	SW846 3050B ³
Vanadium	16.0	5.9	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA44798
- (2) Instrument QC Batch: MA44802
- (3) Prep QC Batch: MP7999

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A3 (2.0-2.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-3A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.2	1.7	mg/kg	1	07/10/18 14:13	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A3 (4.0-4.5) Lab Sample ID: JC69374-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: 92.5
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	56.0	1.1	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	7.2	4.6	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.3	5.7	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44798

(2) Prep QC Batch: MP7999

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A3 (4.0-4.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-4A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	46.4 J-	1.5	mg/kg	1	07/10/18 14:13	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A4 (0.0-0.5) Lab Sample ID: JC69374-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/06/18 Date Received: 07/06/18 Percent Solids: 84.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	61.7	1.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.6	4.9	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.5	2.5	mg/kg	2	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	119	6.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44798

(2) Prep QC Batch: MP7999

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A4 (0.0-0.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-5A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.2 J-	1.7	mg/kg	1	07/10/18 14:13	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (2.0-2.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-6A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.2	1.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.7	4.8	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	17.4	6.0	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44798

(2) Prep QC Batch: MP7999

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (2.0-2.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-6A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.7	mg/kg	1	07/10/18 14:13	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (4.0-4.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-7A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	43.7	1.3	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.2	5.2	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	8.8	6.4	mg/kg	1	07/07/18	07/09/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44798

(2) Prep QC Batch: MP7999

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A4 (4.0-4.5)		Date Sampled: 07/06/18
Lab Sample ID: JC69374-7A		Date Received: 07/06/18
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	40.9	1.8	mg/kg	1	07/10/18 14:13	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A3 (0.0-0.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-2R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.53	0.42	mg/kg	1	07/11/18 15:18	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A3 (2.0-2.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-3R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.48	mg/kg	1	07/11/18 15:13	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A3 (4.0-4.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-4R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.5	0.43	mg/kg	1	07/11/18 15:18	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (0.0-0.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-5R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.4	0.48	mg/kg	1	07/11/18 15:18	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A4 (2.0-2.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-6R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85	0.47	mg/kg	1	07/11/18 15:18	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4 (4.0-4.5)	Date Sampled: 07/06/18
Lab Sample ID: JC69374-7R	Date Received: 07/06/18
Matrix: SO - Soil	Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.8	0.54	mg/kg	1	07/11/18 15:18	DC	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC69771, JC69872, JC70231, and JC70487

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30551R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC69771, JC69872, JC70231, and JC70487 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC69771	FB (20180712)	JC69771-1	Water	7/12/2018		X	X	X
	BS-D5	JC69771-2	Soil	7/12/2018		X	X	X
	BS-F5	JC69771-3	Soil	7/12/2018		X	X	X
	BS-E5	JC69771-4	Soil	7/12/2018		X	X	X
JC69872	FB (20180713)	JC69872-1	Water	7/13/2018		X	X	X
	DUP-4 (20180713)	JC69872-2	Soil	7/13/2018	SW-A3(5.5-6.0)	X	X	X
	SW-A1 (6.0-6.5)	JC69872-3	Soil	7/13/2018		X	X	X
	SW-A4 (6.0-6.5)	JC69872-4	Soil	7/13/2018		X	X	X
	SW-A2 (6.0-6.5)	JC69872-5	Soil	7/13/2018		X	X	X
	SW-A3 (5.5-6.0)	JC69872-6	Soil	7/13/2018		X	X	X
JC70231	FB (20180719)	JC70231-1	Water	7/19/2018		X	X	X
	BS-D6	JC70231-2	Soil	7/19/2018		X	X	X
	BS-E6	JC70231-3	Soil	7/19/2018		X	X	X
JC70487	FB (20180724)	JC70487-1	Water	7/24/2018		X	X	X
	BS-D6A	JC70487-2	Soil	7/24/2018		X		
	BS-F6	JC70487-3	Soil	7/24/2018		X	X	X
	BS-D7	JC70487-4	Soil	7/24/2018		X	X	X
	BS-E7	JC70487-5	Soil	7/24/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC69771, JC70231, and JC70487: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC69872: The MS/MSD analysis performed on sample location SW-A4 (6.0-6.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A4 (6.0-6.5)	Antimony	57.9%	69.2%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC69771, JC70231, and JC70487: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC69872: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A4 (6.0-6.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A3 (5.5-6.0) DUP-4 (20180713)	Chromium	62.7	82.3	27.0%
	Trivalent Chromium	54.7	72.5	28.0%
	Nickel	14.6	13.2	AC
	Vanadium	26.8	25.1	

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A3 (5.5-6.0) and field duplicate sample DUP-4 (20180713) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC69771, JC70231, and JC70487: The serial dilution analysis was not performed using a sample from these SDGs.

DATA REVIEW REPORT

SDG #JC69872: The serial dilution performed on sample location SW-A4 (6.0-6.5) exhibited %D within control limits, with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
SW-A4 (6.0-6.5)	Chromium	10.4%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

SDG #JC69872: The thallium result in sample SW-A1 (6.0-6.5) was reported as non-detected at an elevated reporting limit of 2.2mg/kg. The sample required dilution due to an interfering element.

SDG #JC70487: The thallium result in sample BS-E7 was reported as non-detected at an elevated reporting limit of 2.5mg/kg. The sample required dilution due to an interfering element.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations BS-D5, SW-A4 (6.0-6.5), BS-E6, and BS-D6A in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations BS-D5, SW-A4 (6.0-6.5), BS-E6, and BS-D6A exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-D5, SW-A4 (6.0-6.5), BS-E6, and BS-D6A exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A3 (5.5-6.0) / DUP-4 (20180713)	Hexavalent Chromium	8.0	9.8	20.2%

The difference in the hexavalent chromium results between the parent sample SW-A3 (5.5-6.0) and field duplicate sample DUP-4 (20180713) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

SDGs #JC69771 and JC70231: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC69872 and JC70487: The laboratory duplicate analysis performed on sample locations SW-A4 (6.0-6.5) and BS-D6A exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A3 (5.5-6.0) / DUP-4 (20180713)	Redox Potential	359	354	1.4%
	pH	7.46	7.42	0.5%

The differences in the results between the parent sample SW-A3 (5.5-6.0) and field duplicate sample DUP-4 (20180713) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: September 10, 2018

PEER REVIEW: Dennis Capria

DATE: September 25, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB (20180712)	Date Sampled: 07/12/18
Lab Sample ID: JC69771-1	Date Received: 07/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/12/18 20:25	LS	SW846 7196A
Redox Potential Vs H2	446		mv	1	07/14/18 14:37	AC	ASTM D1498-76
pH ^a	5.33		su	1	07/12/18 18:06	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-2		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.1	0.43	mg/kg	1	07/16/18 16:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	331		mv	1	07/13/18 16:15	TM	ASTM D1498-76M
Solids, Percent	93.4		%	1	07/13/18 09:30	RC	SM2540 G 18TH ED MOD
pH	8.12		su	1	07/13/18 16:15	TM	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F5	Date Sampled: 07/12/18
Lab Sample ID: JC69771-3	Date Received: 07/12/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.8	0.45	mg/kg	1	07/16/18 16:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	07/13/18 16:25	TM	ASTM D1498-76M
Solids, Percent	88.2		%	1	07/13/18 09:30	RC	SM2540 G 18TH ED MOD
pH	8.65		su	1	07/13/18 16:25	TM	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E5	Date Sampled: 07/12/18
Lab Sample ID: JC69771-4	Date Received: 07/12/18
Matrix: SO - Soil	Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99	0.44	mg/kg	1	07/16/18 16:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	376		mv	1	07/13/18 16:29	TM	ASTM D1498-76M
Solids, Percent	91.1		%	1	07/13/18 09:30	RC	SM2540 G 18TH ED MOD
pH	7.92		su	1	07/13/18 16:29	TM	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180712) Lab Sample ID: JC69771-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/12/18 Date Received: 07/12/18 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony	< 6.0	6.0	ug/l	1	07/13/18	07/14/18	ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/13/18	07/14/18	ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/13/18	07/14/18	ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/13/18	07/14/18	ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/13/18	07/14/18	ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44842

(2) Prep QC Batch: MP8083

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180712) Lab Sample ID: JC69771-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/12/18 Date Received: 07/12/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/14/18 07:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-2A		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.0	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Nickel	10.7	4.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Vanadium	24.2	5.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44841

(2) Prep QC Batch: MP8074

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-2A		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.9	1.4	mg/kg	1	07/16/18 16:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-3A		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Chromium	23.2	1.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Nickel	13.8	4.5	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Vanadium	24.8	5.7	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44841

(2) Prep QC Batch: MP8074

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F5	Date Sampled: 07/12/18
Lab Sample ID: JC69771-3A	Date Received: 07/12/18
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.4	1.6	mg/kg	1	07/16/18 16:10	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-4A		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Chromium	14.5	1.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.3	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²
Vanadium	19.9	5.3	mg/kg	1	07/12/18	07/13/18	MET SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44841

(2) Prep QC Batch: MP8074

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E5		Date Sampled: 07/12/18
Lab Sample ID: JC69771-4A		Date Received: 07/12/18
Matrix: SO - Soil		Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.5	1.5	mg/kg	1	07/16/18 16:10	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusua

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC69872

Client/Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes										
Company Name: Asadis		Project Name: PPG Jersey City Site 107												UW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank										
Street Address: 10 Frisvold Lane Suite 200		Street: 10 Chapel Avenue																						
City: Newtown PA 18440		City: Jersey City NJ																						
Project Contact: Krista Mastrosola		Project #: NP000770.0001.0005																						
Phone #: _____ Fax #: _____		Client Purchase Order #: _____																						
Sampler(s) Name(s): Christina Cielli Phone #: 201.264.6000		Project Manager: Jim McLaughlin																						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY						
								HCl	NaOH	PIN03	H2SO4	NONE	DI Water	MEOH	ENGORE	Total Chromium	Hexavalent Chromium		Trivalent Chromium	Antimony	Nickel	Tellurium	Vanadium	
1	FB (20180713)		7/13/18	1100	CC	FB	4																	
2	DUP-4 (20180713)		7/13/18	-	CC	SO	1																	A22
3	SW-A1 (6.0-6.5)		7/13/18	1130	CC	SO	1																	G13
4	SW-A4 (6.0-6.5)		7/13/18	1145	CC	SO	1																	C36
	SW-A4 (6.0-6.5) MS		7/13/18	1145	CC	SO	1																	
5	SW-A2 (6.0-6.5) MSD		7/13/18	1145	CC	SO	1																	
6	SW-A3 (5.5-6.0)		7/13/18	1140	CC	SO	1																	

Turnaround Time (Business days)	Approved by (SGS Project Manager)/Date:	Data Deliverable Information	Comments / Special Instructions
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Equs <input type="checkbox"/> Other _____ <small>NJ Data of Known Quality Protocol Reporting</small>	<input type="checkbox"/> Commercial "A" = Results Only; <input type="checkbox"/> Commercial "B" = Results + QC Summary <input type="checkbox"/> NJ Reduced = Results + QC Summary + Partial Raw data	INITIAL ASSESSMENT SP LABEL VERIFICATION _____ <small>Sample inventory is verified upon receipt in the Laboratory</small>

Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.		Sample inventory is verified upon receipt in the Laboratory	
Relinquished by Sampler: Cielli	Date Time: 7/12/18 1345	Received By: Robert Chambers	Date Time: 7/13/18	Relinquished By: Robert Chambers	Date Time: 7/13/18
Relinquished by Sampler:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:
Relinquished by:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:

Custody Seal # **03154** Intact Not intact Preserved where applicable

On Ice **IP** Cooler Temp. **3.10C**



5.2
5

Report of Analysis

Client Sample ID: FB(20180713)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-1	Date Received: 07/13/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/13/18 19:37	LS	SW846 7196A
Redox Potential Vs H2	407		mv	1	07/14/18 14:33	AC	ASTM D1498-76
pH ^a	4.92		su	1	07/13/18 15:43	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180713)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-1A		Date Received: 07/13/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/14/18	07/17/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/14/18	07/17/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/14/18	07/17/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/14/18	07/17/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/14/18	07/17/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44854

(2) Prep QC Batch: MP8096

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180713)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-1A		Date Received: 07/13/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.2
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/17/18 01:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-4(20180713)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-2		Date Received: 07/13/18
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.8	0.44	mg/kg	1	07/17/18 15:06	RP	SW846 3060A/7196A
Redox Potential Vs H2	354		mv	1	07/14/18 11:45	AC	ASTM D1498-76M
Solids, Percent	90.3		%	1	07/15/18 11:00	SF	SM2540 G 18TH ED MOD
pH	7.42		su	1	07/14/18 10:49	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-4(20180713)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-2A		Date Received: 07/13/18
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	82.3 J	1.1	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.2	4.4	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.1	5.5	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44853

(2) Prep QC Batch: MP8103

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-4(20180713)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-2A		Date Received: 07/13/18
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	72.5 J	1.5	mg/kg	1	07/17/18 15:06	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A1(6.0-6.5)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-3	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.2	0.45	mg/kg	1	07/17/18 15:06	RP	SW846 3060A/7196A
Redox Potential Vs H2	245		mv	1	07/14/18 11:49	AC	ASTM D1498-76M
Solids, Percent	88.8		%	1	07/15/18 11:00	SF	SM2540 G 18TH ED MOD
pH	9.07		su	1	07/14/18 10:49	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A1(6.0-6.5) Lab Sample ID: JC69872-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/13/18 Date Received: 07/13/18 Percent Solids: 88.8
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ² SW846 3050B ³
Chromium	39.0 J	1.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ² SW846 3050B ³
Nickel	23.0	4.4	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ² SW846 3050B ³
Thallium ^a	< 2.2	2.2	mg/kg	2	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ³
Vanadium	38.6	5.5	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ² SW846 3050B ³

- (1) Instrument QC Batch: MA44851
- (2) Instrument QC Batch: MA44853
- (3) Prep QC Batch: MP8103

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A1(6.0-6.5)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-3A	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.8 J	1.6	mg/kg	1	07/17/18 15:06	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4(6.0-6.5)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-4		Date Received: 07/13/18
Matrix: SO - Soil		Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.0	0.45	mg/kg	1	07/17/18 15:00	RP	SW846 3060A/7196A
Redox Potential Vs H2	346		mv	1	07/14/18 11:53	AC	ASTM D1498-76M
Solids, Percent	89		%	1	07/15/18 11:00	SF	SM2540 G 18TH ED MOD
pH	7.77		su	1	07/14/18 10:49	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A4(6.0-6.5)		Date Sampled: 07/13/18
Lab Sample ID: JC69872-4A		Date Received: 07/13/18
Matrix: SO - Soil		Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	34.2 J	1.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	15.5	4.4	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	24.7	5.5	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA44853

(2) Prep QC Batch: MP8103

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A4(6.0-6.5)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-4A	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.2 J	1.6	mg/kg	1	07/17/18 15:00	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A2(6.0-6.5)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-5	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 91.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.1	0.44	mg/kg	1	07/17/18 15:06	RP	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	07/14/18 11:57	AC	ASTM D1498-76M
Solids, Percent	91.9		%	1	07/15/18 11:00	SF	SM2540 G 18TH ED MOD
pH	9.05		su	1	07/14/18 10:49	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A2(6.0-6.5) Lab Sample ID: JC69872-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/13/18 Date Received: 07/13/18 Percent Solids: 91.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.7 J	1.1	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.5	4.4	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	29.2	5.4	mg/kg	1	07/14/18	07/16/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44853

(2) Prep QC Batch: MP8103

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A2(6.0-6.5)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-5A	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 91.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.6 J	1.5	mg/kg	1	07/17/18 15:06	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(5.5-6.0)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-6	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 90.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.0	0.44	mg/kg	1	07/17/18 15:06	RP	SW846 3060A/7196A
Redox Potential Vs H2	359		mv	1	07/14/18 13:37	AC	ASTM D1498-76M
Solids, Percent	90.5		%	1	07/15/18 11:00	SF	SM2540 G 18TH ED MOD
pH	7.46		su	1	07/14/18 10:49	AC	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A3(5.5-6.0) Lab Sample ID: JC69872-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/13/18 Date Received: 07/13/18 Percent Solids: 90.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹
Chromium	62.7 J	1.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹
Nickel	14.6	4.2	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹
Thallium	< 1.1	1.1	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹
Vanadium	26.8	5.3	mg/kg	1	07/14/18	07/16/18	ND	SW846 6010D ¹

(1) Instrument QC Batch: MA44853

(2) Prep QC Batch: MP8103

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A3(5.5-6.0)	Date Sampled: 07/13/18
Lab Sample ID: JC69872-6A	Date Received: 07/13/18
Matrix: SO - Soil	Percent Solids: 90.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.7 J	1.5	mg/kg	1	07/17/18 15:06	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180719) Lab Sample ID: JC70231-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/18 Date Received: 07/19/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	388		mv	1	07/20/18 13:15	AC	ASTM D1498-76
pH ^a	5.69		su	1	07/19/18 18:50	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D6	Date Sampled: 07/19/18
Lab Sample ID: JC70231-2	Date Received: 07/19/18
Matrix: SO - Soil	Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	46.4	0.89	mg/kg	2	07/23/18 13:38	DC	SW846 3060A/7196A
Redox Potential Vs H2	369		mv	1	07/20/18 09:56	AC	ASTM D1498-76M
Solids, Percent	90.3		%	1	07/20/18 09:43	RI	SM2540 G 18TH ED MOD
pH	6.36		su	1	07/20/18 09:39	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E6	Date Sampled: 07/19/18
Lab Sample ID: JC70231-3	Date Received: 07/19/18
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.9	0.45	mg/kg	1	07/23/18 13:35	DC	SW846 3060A/7196A
Redox Potential Vs H2	386		mv	1	07/20/18 10:03	AC	ASTM D1498-76M
Solids, Percent	89.2		%	1	07/20/18 09:43	RI	SM2540 G 18TH ED MOD
pH	6.18		su	1	07/20/18 09:47	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180719) Lab Sample ID: JC70231-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/18 Date Received: 07/19/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/20/18	07/22/18	GT SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/20/18	07/22/18	GT SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/20/18	07/22/18	GT SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/20/18	07/22/18	GT SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/20/18	07/22/18	GT SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44897

(2) Prep QC Batch: MP8184

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180719)	Date Sampled: 07/19/18
Lab Sample ID: JC70231-1A	Date Received: 07/19/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/19/18 19:50	LS	SW846 7196A
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/22/18 12:15	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D6		Date Sampled: 07/19/18
Lab Sample ID: JC70231-2A		Date Received: 07/19/18
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	68.1	1.1	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.9	4.5	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.5	5.6	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44894

(2) Prep QC Batch: MP8197

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D6		Date Sampled: 07/19/18
Lab Sample ID: JC70231-2A		Date Received: 07/19/18
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	2.0	mg/kg	1	07/23/18 13:38	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E6		Date Sampled: 07/19/18
Lab Sample ID: JC70231-3A		Date Received: 07/19/18
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	27.6	1.1	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.1	4.5	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.6	5.6	mg/kg	1	07/20/18	07/21/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44894

(2) Prep QC Batch: MP8197

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E6		Date Sampled: 07/19/18
Lab Sample ID: JC70231-3A		Date Received: 07/19/18
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.6	mg/kg	1	07/23/18 13:35	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180724)		Date Sampled: 07/24/18
Lab Sample ID: JC70487-1		Date Received: 07/24/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/24/18 22:20	LS	SW846 7196A
Redox Potential Vs H2	461		mv	1	07/25/18 09:39	AC	ASTM D1498-76
pH ^a	5.63		su	1	07/24/18 18:10	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D6A	Date Sampled: 07/24/18
Lab Sample ID: JC70487-2	Date Received: 07/24/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.0	0.46	mg/kg	1	07/25/18 14:56	RI	SW846 3060A/7196A
Redox Potential Vs H2	372		mv	1	07/25/18 11:00	AC	ASTM D1498-76M
Solids, Percent	87.9		%	1	07/25/18 09:30	RC	SM2540 G 18TH ED MOD
pH	5.94		su	1	07/25/18 10:44	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F6		Date Sampled: 07/24/18
Lab Sample ID: JC70487-3		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.7	0.47	mg/kg	1	07/25/18 15:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	298		mv	1	07/25/18 11:15	AC	ASTM D1498-76M
Solids, Percent	85.8		%	1	07/25/18 09:30	RC	SM2540 G 18TH ED MOD
pH	7.65		su	1	07/25/18 10:56	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D7	Date Sampled: 07/24/18
Lab Sample ID: JC70487-4	Date Received: 07/24/18
Matrix: SO - Soil	Percent Solids: 79.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60	0.50	mg/kg	1	07/25/18 15:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	349		mv	1	07/25/18 11:28	AC	ASTM D1498-76M
Solids, Percent	79.6		%	1	07/25/18 09:30	RC	SM2540 G 18TH ED MOD
pH	6.30		su	1	07/25/18 11:00	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E7		Date Sampled: 07/24/18
Lab Sample ID: JC70487-5		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	36.6	0.49	mg/kg	1	07/25/18 15:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	07/25/18 11:41	AC	ASTM D1498-76M
Solids, Percent	82.1		%	1	07/25/18 09:30	RC	SM2540 G 18TH ED MOD
pH	7.16		su	1	07/25/18 11:15	AC	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20180724)		Date Sampled: 07/24/18
Lab Sample ID: JC70487-1A		Date Received: 07/24/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/25/18	07/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/25/18	07/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/25/18	07/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/25/18	07/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/25/18	07/25/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44924

(2) Prep QC Batch: MP8279

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180724)		Date Sampled: 07/24/18
Lab Sample ID: JC70487-1A		Date Received: 07/24/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/25/18 18:18	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F6		Date Sampled: 07/24/18
Lab Sample ID: JC70487-3A		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.8	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	5.9	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44925

(2) Prep QC Batch: MP8282

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F6		Date Sampled: 07/24/18
Lab Sample ID: JC70487-3A		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.3	1.7	mg/kg	1	07/25/18 20:40	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D7		Date Sampled: 07/24/18
Lab Sample ID: JC70487-4A		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 79.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	10.7	1.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	5.0	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.0	6.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44925

(2) Prep QC Batch: MP8282

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D7	Date Sampled: 07/24/18
Lab Sample ID: JC70487-4A	Date Received: 07/24/18
Matrix: SO - Soil	Percent Solids: 79.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.1	1.7	mg/kg	1	07/25/18 20:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E7 Lab Sample ID: JC70487-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/24/18 Date Received: 07/24/18 Percent Solids: 82.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	81.7	1.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.1	4.9	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.5	2.5	mg/kg	2	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.6	6.2	mg/kg	1	07/25/18	07/25/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44925

(2) Prep QC Batch: MP8282

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E7		Date Sampled: 07/24/18
Lab Sample ID: JC70487-5A		Date Received: 07/24/18
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	45.1	1.7	mg/kg	1	07/25/18 20:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC70911 and JC70989

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30552R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC70911 and JC70989 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC70911	FB (20180730)	JC70911-1	Water	7/30/2018		X	X	X
	BS-E7A	JC70911-2	Soil	7/30/2018		X	X	X
	BS-F7	JC70911-3	Soil	7/30/2018		X	X	X
	BS-C7	JC70911-4	Soil	7/30/2018		X	X	X
	BS-F8	JC70911-5	Soil	7/30/2018		X	X	X
JC70989	FB (20180731)	JC70989-1	Water	7/31/2018		X	X	X
	BS-E8	JC70989-2	Soil	7/31/2018		X	X	X
	DUP-7 (20180731)	JC70989-3	Soil	7/31/2018	BS-E8	X	X	X
	BS-D8	JC70989-4	Soil	7/31/2018		X	X	X
	DUP-8 (20180731)	JC70989-5	Soil	7/31/2018	BS-D8	X	X	X
	BS-C8	JC70989-6	Soil	7/31/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs # JC70911: The MS/MSD analysis was not performed using a sample from this SDG.

SDG #JC70989: The MS/MSD analysis performed on sample location BS-D8 and BS-C8 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-D8	Antimony	54.2%	54.9%
BS-C8	Antimony	66.6%	64.3%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC70911: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDG #JC70989: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-C8. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E8 / DUP-7 (20180731)	Chromium	15.1	15.5	2.6%
	Trivalent Chromium	15.1	15.5	2.6%
	Nickel	12.3	12.8	AC
	Vanadium	22.7	22.9	
BS-D8 / DUP-8 (20180731)	Chromium	18.0	16.1	11.1%
	Trivalent Chromium	18.0	15.6	14.3%
	Nickel	13.5	12.1	AC
	Vanadium	23.8	23.1	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-E8 and field duplicate sample DUP-7 (20180731) were acceptable.

The differences in the results between the parent sample BS-D8 and field duplicate sample DUP-8 (20180731) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample

DATA REVIEW REPORT

are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC70911: The serial dilution analysis was not performed using a sample from this SDG.

SDG #JC70989: The serial dilution performed on sample location BS-C8 exhibited %D within control limits.

SDG #JC70989: The serial dilution performed on sample location BS-D8 exhibited %D within control limits with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
BS-D8	Chromium	12.5%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

SDG #JC70989: The thallium result in sample BS-C8 was reported as non-detected at an elevated reporting limit of 2.4mg/kg. The sample required dilution due to an interfering element.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC70911 and JC70989: The MS analysis performed on sample locations BS-E7A and BS-C8 in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC70989: The MS analysis performed on sample location BS-D8 exhibited insoluble and soluble hexavalent chromium spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-D8	Hexavalent Chromium, Soluble	< 50%	52.1%
	Hexavalent Chromium, Insoluble	70.2%	AC (85.3%)

Notes:

AC Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations BS-E7A, BS-D8, and BS-C8 exhibited recoveries within the control limits.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-E7A, BS-D8, and BS-C8 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E8 / DUP-7 (20180731)	Hexavalent Chromium	0.47 U	0.48 U	AC
BS-D8 / DUP-8 (20180731)	Hexavalent Chromium	0.50 U	0.50 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample BS-E8 and field duplicate sample DUP-7 (20180731).

Hexavalent chromium was not detected in the parent sample BS-D8 and field duplicate sample DUP-8 (20180731).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

SDGs #JC70911: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC70989: The laboratory duplicate analysis performed on sample locations BS-D8 and BS-C8 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E8 / DUP-7 (20180731)	Redox Potential	214	194	9.8%
	pH	6.98	7.04	0.9%
BS-D8 / DUP-8 (20180731)	Redox Potential	227	205	10.2%
	pH	6.85	6.85	0.0%

The differences in the results between the parent sample BS-E8 and field duplicate sample DUP-7 (20180731) were acceptable.

The differences in the results between the parent sample BS-D8 and field duplicate sample DUP-8 (20180731) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: September 7, 2018

PEER REVIEW: Dennis Capria

DATE: September 25, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusua

E

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)											Matrix Codes				
Company Name Arcaadis		Project Name PPG Jersey City Site 107													DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank				
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Avenue																	
City Newtown PA 18440		City Sersey City NJ																	
Project Contact Krista Mastracola		Project # N1000770.0001.00005																	
Phone # 610.755.7080		Client Purchase Order #																	
Sampler(s) Name(s) Christa Celli		Project Manager Jim McLaughlin																	
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	D/Water	MEOH	ENCORE	Requested Analysis	Matrix Codes		
1	FB (20180730)		7/30/18	1120	CC	FB	4									Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium			
2	BS-E7A		7/30/18	1325	CC	SO	1									X X X X X X X X X X X X	A14		
3	BS-E7		7/30/18	1320	CC	SO	1									X X X X X X X X X X X X	G37		
4	BS-C7		7/30/18	1330	CC	SO	1									X X X X X X X X X X X X	P6		
5	BS-FB		7/30/18	1335	CC	SO	1									X X X X X X X X X X X X			
Turnaround Time (Business days)				Data Deliverable Information											Comments / Special Instructions				
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				Approved by (SGS Project Manager)/Date:				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equs</i> <input type="checkbox"/> Other				INITIAL ASSESSMENT 3A (N) LABEL VERIFICATION			
Emergency & Rush T/A data available via LabLink				Sample Custody must be documented below each time samples change possession, including courier delivery.											Sample inventory is verified upon receipt in the Laboratory				
1	Relinquished by Sample:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	
1	<i>C. Celli</i>	7/30/18 1405	1	<i>Robert Chambers</i>	7/30/18 1550	2	<i>Robert Chambers</i>	7/30/18	2	<i>Robert Chambers</i>	7/30/18	3	<i>Robert Chambers</i>	7/30/18	4	<i>Robert Chambers</i>	7/30/18	5	<i>Robert Chambers</i>
3	Relinquished by Sample:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	
3																			
5	Relinquished by:	Date Time:	Received By:	Date Time:	Custody Seal #	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	<input type="checkbox"/> Preserved where applicable	<input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp. <i>3.10c</i>									

5.2
5

Report of Analysis

Client Sample ID: FB(20180730)	Date Sampled: 07/30/18
Lab Sample ID: JC70911-1	Date Received: 07/30/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/30/18 17:25	LS	SW846 7196A
Redox Potential Vs H2	424		mv	1	07/31/18 16:16	AC	ASTM D1498-76
pH ^a	5.52		su	1	07/30/18 16:00	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E7A	Date Sampled: 07/30/18
Lab Sample ID: JC70911-2	Date Received: 07/30/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	32.6	0.46	mg/kg	1	07/31/18 16:55	RI	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	07/31/18 14:10	AC	ASTM D1498-76M
Solids, Percent	86.5		%	1	07/31/18 09:35	RC	SM2540 G 18TH ED MOD
pH	7.10		su	1	07/31/18 13:55	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F7	Date Sampled: 07/30/18
Lab Sample ID: JC70911-3	Date Received: 07/30/18
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.0	0.43	mg/kg	1	07/31/18 17:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	289		mv	1	07/31/18 14:25	AC	ASTM D1498-76M
Solids, Percent	92.3		%	1	07/31/18 09:35	RC	SM2540 G 18TH ED MOD
pH	7.42		su	1	07/31/18 13:59	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C7	Date Sampled: 07/30/18
Lab Sample ID: JC70911-4	Date Received: 07/30/18
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	07/31/18 17:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	306		mv	1	07/31/18 14:28	AC	ASTM D1498-76M
Solids, Percent	84.3		%	1	07/31/18 09:35	RC	SM2540 G 18TH ED MOD
pH	6.62		su	1	07/31/18 14:07	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F8	Date Sampled: 07/30/18
Lab Sample ID: JC70911-5	Date Received: 07/30/18
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	07/31/18 17:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	230		mv	1	07/31/18 14:38	AC	ASTM D1498-76M
Solids, Percent	84.3		%	1	07/31/18 09:35	RC	SM2540 G 18TH ED MOD
pH	6.19		su	1	07/31/18 14:10	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180730) Lab Sample ID: JC70911-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/30/18 Date Received: 07/30/18 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/31/18	08/01/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/31/18	08/01/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/31/18	08/01/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/31/18	08/01/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/31/18	08/01/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44996

(2) Prep QC Batch: MP8382

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180730)	Date Sampled: 07/30/18
Lab Sample ID: JC70911-1A	Date Received: 07/30/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/01/18 05:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E7A		Date Sampled: 07/30/18
Lab Sample ID: JC70911-2A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	65.9	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.9	4.8	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.7	6.0	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44992

(2) Prep QC Batch: MP8389

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E7A		Date Sampled: 07/30/18
Lab Sample ID: JC70911-2A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	33.3	1.7	mg/kg	1	07/31/18 18:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F7		Date Sampled: 07/30/18
Lab Sample ID: JC70911-3A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	58.9	1.1	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.5	4.3	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	5.4	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44992

(2) Prep QC Batch: MP8389

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F7		Date Sampled: 07/30/18
Lab Sample ID: JC70911-3A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	50.9	1.5	mg/kg	1	07/31/18 18:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C7		Date Sampled: 07/30/18
Lab Sample ID: JC70911-4A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.9	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	9.5	4.6	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.7	5.8	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44992

(2) Prep QC Batch: MP8389

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C7		Date Sampled: 07/30/18
Lab Sample ID: JC70911-4A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.9	1.7	mg/kg	1	07/31/18 18:35	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F8		Date Sampled: 07/30/18
Lab Sample ID: JC70911-5A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.5	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.8	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.3	6.1	mg/kg	1	07/31/18	07/31/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44992

(2) Prep QC Batch: MP8389

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F8		Date Sampled: 07/30/18
Lab Sample ID: JC70911-5A		Date Received: 07/30/18
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	1.7	mg/kg	1	07/31/18 18:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180731) Lab Sample ID: JC70989-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/31/18 Date Received: 07/31/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/31/18 18:48	LS	SW846 7196A
Redox Potential Vs H2	415		mv	1	08/01/18 09:16	AC	ASTM D1498-76
pH ^a	5.44		su	1	07/31/18 16:12	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-2	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	08/01/18 15:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	214		mv	1	08/01/18 14:08	AC	ASTM D1498-76M
Solids, Percent	84.9		%	1	08/01/18 09:49	RC	SM2540 G 18TH ED MOD
pH	6.98		su	1	08/01/18 13:50	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-7(20180731)	Date Sampled: 07/31/18
Lab Sample ID: JC70989-3	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	08/01/18 15:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	194		mv	1	08/01/18 14:15	AC	ASTM D1498-76M
Solids, Percent	82.7		%	1	08/01/18 09:49	RC	SM2540 G 18TH ED MOD
pH	7.04		su	1	08/01/18 13:54	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-4	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	08/01/18 15:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	227		mv	1	08/01/18 14:19	AC	ASTM D1498-76M
Solids, Percent	80.5		%	1	08/01/18 09:49	RC	SM2540 G 18TH ED MOD
pH	6.85		su	1	08/01/18 14:01	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-8(20180731)	Date Sampled: 07/31/18
Lab Sample ID: JC70989-5	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	08/01/18 16:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	205		mv	1	08/01/18 14:22	AC	ASTM D1498-76M
Solids, Percent	79.7		%	1	08/01/18 09:49	RC	SM2540 G 18TH ED MOD
pH	6.85		su	1	08/01/18 14:08	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-6	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	18.1	0.49	mg/kg	1	08/01/18 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	285		mv	1	08/01/18 14:30	AC	ASTM D1498-76M
Solids, Percent	80.9		%	1	08/01/18 10:08	RC	SM2540 G 18TH ED MOD
pH	7.65		su	1	08/01/18 14:13	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180731)		Date Sampled: 07/31/18
Lab Sample ID: JC70989-1A		Date Received: 07/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/01/18	08/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/01/18	08/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/01/18	08/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/01/18	08/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/01/18	08/01/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA44997

(2) Prep QC Batch: MP8415

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180731)		Date Sampled: 07/31/18
Lab Sample ID: JC70989-1A		Date Received: 07/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/01/18 20:56	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E8		Date Sampled: 07/31/18
Lab Sample ID: JC70989-2A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.1 J	1.1	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.3	4.5	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.7	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44997

(2) Prep QC Batch: MP8414

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E8		Date Sampled: 07/31/18
Lab Sample ID: JC70989-2A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.1	1.6	mg/kg	1	08/01/18 20:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-7(20180731) Lab Sample ID: JC70989-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/31/18 Date Received: 07/31/18 Percent Solids: 82.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.5 J	1.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.8	5.0	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.9	6.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44997

(2) Prep QC Batch: MP8414

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-7(20180731)		Date Sampled: 07/31/18
Lab Sample ID: JC70989-3A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.7	mg/kg	1	08/01/18 20:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-4A	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.0 J	1.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.5	4.8	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.8	5.9	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44997

(2) Prep QC Batch: MP8414

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D8		Date Sampled: 07/31/18
Lab Sample ID: JC70989-4A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.7	mg/kg	1	08/01/18 19:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-8(20180731) Lab Sample ID: JC70989-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/31/18 Date Received: 07/31/18 Percent Solids: 79.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.1 J	1.3	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	5.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	6.5	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA44997

(2) Prep QC Batch: MP8414

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-8(20180731)		Date Sampled: 07/31/18
Lab Sample ID: JC70989-5A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	1.8	mg/kg	1	08/01/18 20:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-C8		Date Sampled: 07/31/18
Lab Sample ID: JC70989-6A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ²	SW846 3050B ³
Chromium	51.9	1.2	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ²	SW846 3050B ³
Nickel	11.5	4.8	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.4	2.4	mg/kg	2	08/01/18	08/02/18	ND SW846 6010D ¹	SW846 3050B ³
Vanadium	30.6	6.1	mg/kg	1	08/01/18	08/01/18	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA44997

(2) Instrument QC Batch: MA45001

(3) Prep QC Batch: MP8412

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C8		Date Sampled: 07/31/18
Lab Sample ID: JC70989-6A		Date Received: 07/31/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	33.8	1.7	mg/kg	1	08/01/18 23:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-2R	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	08/03/18 16:08	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: DUP-7(20180731)	Date Sampled: 07/31/18
Lab Sample ID: JC70989-3R	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	08/03/18 16:08	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D8	Date Sampled: 07/31/18
Lab Sample ID: JC70989-4R	Date Received: 07/31/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	08/03/18 16:05	RI	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC71067

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30553R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC71067 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB (20180801)	JC71067-1	Water	8/1/2018		X	X	X
SW-A61 (0.0-0.5)	JC71067-2	Soil	8/1/2018		X	X	X
SW-A61 (2.0-2.5)	JC71067-3	Soil	8/1/2018		X	X	X
SW-A61 (4.0-4.5)	JC71067-4	Soil	8/1/2018		X	X	X
SW-A61 (6.0-6.5)	JC71067-5	Soil	8/1/2018		X	X	X
BS-G5T	JC71067-6	Soil	8/1/2018		X	X	X
SW-A60 (0.0-0.5)	JC71067-7	Soil	8/1/2018		X	X	X
SW-A60 (2.0-2.5)	JC71067-8	Soil	8/1/2018		X	X	X
SW-A60 (4.0-4.5)	JC71067-9	Soil	8/1/2018		X	X	X
SW-A60 (6.0-6.5)	JC71067-10	Soil	8/1/2018		X	X	X
BS-H5T	JC71067-11	Soil	8/1/2018		X	X	X
SW-A59 (0.0-0.5)	JC71067-12	Soil	8/1/2018		X	X	X
SW-A59 (2.0-2.5)	JC71067-13	Soil	8/1/2018		X	X	X
SW-A59 (4.0-4.5)	JC71067-14	Soil	8/1/2018		X	X	X
SW-A59 (6.0-6.5)	JC71067-15	Soil	8/1/2018		X	X	X
BS-I5T	JC71067-16	Soil	8/1/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-A61 (0.0-0.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-A61 (0.0-0.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

All analytes associated with laboratory duplicate RPD were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes
SW-A61 (0.0-0.5)	Hexavalent Chromium

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	RPD <20%	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A61 (0.0-0.5)	SW846 9045D	Analysis: 7 days	< 24 hours of receipt at laboratory
SW-A61 (2.0-2.5)			
SW-A61 (4.0-4.5)			
SW-A61 (6.0-6.5)			
BS-G5T			
SW-A60 (0.0-0.5)			
SW-A60 (2.0-2.5)			
SW-A60 (4.0-4.5)			
SW-A60 (6.0-6.5)			
BS-H5T			
SW-A59 (0.0-0.5)			
SW-A59 (2.0-2.5)			
SW-A59 (4.0-4.5)			
SW-A59 (6.0-6.5)			
BS-I5T			

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location SW-A61 (0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: September 7, 2018

PEER REVIEW: Dennis Capria

DATE: September 25, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Boiler Order Control #
SGS Quote #
SGS Job #

ES-072318-P25
21067

Client Reporting Information			Project Information			Requested Analysis (see TEST CODE sheet)											Matrix Codes								
Company Name ARCADIS			Project Name PPG JERSEY CITY SITE 107			Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium								LAB USE ONLY					
Street Address 10 FRIENDS LANE SUITE 200			Street 18 CHAPEL AVE																		Billing Information (if different from Report to)			Matrix Codes	
City, State, Zip NEWTON NJ 18440			City, State JERSEY CITY NJ																						
Project Contact VERISA MASTROCOLA			Project #														Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank								
Phone # 610-755-7080			Client Purchase Order # NP000770.0001.00005																						
Sampler(s) Name(s) CHRISTIN CIFELLI 201.204.8625			Project Manager JIM McLAUGHLIN																						
Lab Sample #	Field ID / Point of Collection	MEOHDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	HNO3	H2SO4	H2SO4	HNO3	Dilution	MEOH	ENCORE										
1	FB (20180801)		8/1/18	1345	CC	FB	4												A21						
2	SW-A61 (0.0-0.5)		8/1/18	1240	CC	SO	1												C58						
3	SW-A61 (2.0-2.5)		8/1/18	1245	CC	SO	1												C3						
4	SW-A61 (4.0-4.5)		8/1/18	1250	CC	SO	1																		
5	SW-A61 (6.0-6.5)		8/1/18	1255	CC	SO	1																		
6	BS-G5T		8/1/18	1300	CC	SO	1																		
7	SW-A60 (0.0-0.5)		8/1/18	1305	CC	SO	1																		
8	SW-A60 (2.0-2.5)		8/1/18	1310	CC	SO	1																		
9	SW-A60 (4.0-4.5)		8/1/18	1315	CC	SO	1																		
10	SW-A60 (6.0-6.5)		8/1/18	1320	CC	SO	1																		
11	BS-H5T		8/1/18	1330	CC	SO	1																		
Turnaround Time (Business days)			Approved by (SGS Project Manager)/Date:			Data Deliverable Information					Comments / Special Instructions														
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EGIS <input type="checkbox"/> Other														
Emergency & Rush T/A data available via LabLink						Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data					Sample inventory is verified upon receipt in the Laboratory														
Sample Custody must be documented below each time samples change possession, including courier delivery.																									
Relinquished by:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:														
1	8/1/18 1415	1	8/1/18 210	2	8/1/18 1710	2	8/1/18	3	8/1/18	4	8/1/18	5	8/1/18	6	8/1/18	7	8/1/18	8	8/1/18	9					
3		3		4		5		Custody Sign 07382			<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact			Preserved where applicable				On Ice	Cooler Temp. 7.3						

5.2 5

SGS North America Inc. - Dayton
 2235 Route 130, Dayton, NJ 08810
 TEL 732-329-0200 FAX 732-329-3499
 www.sgs.com/ehsus

FED-EX Tracking # _____ Bottle Order Control # _____
 SGS Quote # _____ SGS Job # **JC71067**

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes
Company Name ARCADIS		Project Name PPA JERSEY CITY SITE 107										TOTAL CHROMIUM HEXAVALENT CHROMIUM TRIVALENT CHROMIUM ANTIMONY NICKEL THALLIUM VANADIUM							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 FRIENDS LANE SUITE 200		Street 18C																	
City NEWTOWN PA 18440		City JERSEY CITY NJ																	
Project Contact KRISTA MASTROCCA		Project # NP000770.0001.0005																	
Phone # 610-755-7080		Client Purchase Order # 																	
Sampler(s) Name(s) CHRISTIN CIFELLI		Project Manager JIM McLAUGHLIN										LAB USE ONLY							
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HO	NaOH	HNO3	H2SO4		NONE	DI Water	MEOH	ENDURE			
12	SW-A59(0.0-0.5)		8/1/18	1330	CC	SO	1												
13	SW-A59(2.0-2.5)		8/1/18	1340	CC	SO	1												
14	SW-A59(4.0-4.5)		8/1/18	1335	CC	SO	1												
15	SW-A59(6.0-6.5)		8/1/18	1345	CC	SO	1												
16	BS-I5T		8/1/18	1350	CC	SO	1												
Turnaround Time (Business days)		Data Deliverable Information											Comments / Special Instructions						
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____ _____ _____ _____											<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULL T1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format EQUS <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting						
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data											Sample inventory is verified upon receipt in the Laboratory						
Relinquished by Sampler: C. Cifelli		Date Time: 8/1/18 1445		Received By: J. Schan				Date Time: 8/1/18 2115				Relinquished by: J. Schan		Date Time: 8/1/18 1710		Received By: [Signature]			
Relinquished by Sampler: 		Date Time: 		Received By: 				Date Time: 				Relinquished by: 		Date Time: 		Received By: 			
Relinquished by: 		Date Time: 		Received By: 				Date Time: 				Relinquished by: 		Date Time: 		Received By: 			
Custody Seal # 07382		<input type="checkbox"/> Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Not intact <input type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp.										C10							

5.2 5

Report of Analysis

Client Sample ID: FB(20180801) Lab Sample ID: JC71067-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/01/18 22:15	LS	SW846 7196A
Redox Potential Vs H2	471		mv	1	08/07/18 16:05	AC	ASTM D1498-76
pH ^a	5.74		su	1	08/01/18 17:49	GE	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A61(0.0-0.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-2	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.9 J	0.48	mg/kg	1	08/06/18 16:09	RI	SW846 3060A/7196A
Redox Potential Vs H2	373		mv	1	08/08/18 10:48	AC	ASTM D1498-76M
Solids, Percent	83.7		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.47 J		su	1	08/08/18 10:32	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A61(2.0-2.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-3	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.48	mg/kg	1	08/06/18 16:13	RI	SW846 3060A/7196A
Redox Potential Vs H2	375		mv	1	08/08/18 10:53	AC	ASTM D1498-76M
Solids, Percent	82.7		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.38 J		su	1	08/08/18 10:37	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A61(4.0-4.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-4	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.4 J	0.46	mg/kg	1	08/06/18 16:13	RI	SW846 3060A/7196A
Redox Potential Vs H2	401		mv	1	08/08/18 10:56	AC	ASTM D1498-76M
Solids, Percent	86.5		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.54 J		su	1	08/08/18 10:40	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A61(6.0-6.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-5	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.7 J	0.51	mg/kg	1	08/06/18 16:13	RI	SW846 3060A/7196A
Redox Potential Vs H2	257		mv	1	08/08/18 11:54	AC	ASTM D1498-76M
Solids, Percent	78.3		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	9.38 J		su	1	08/08/18 10:44	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G5T	Date Sampled: 08/01/18
Lab Sample ID: JC71067-6	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.2 J	0.51	mg/kg	1	08/06/18 16:13	RI	SW846 3060A/7196A
Redox Potential Vs H2	288		mv	1	08/08/18 12:00	AC	ASTM D1498-76M
Solids, Percent	78.1		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	9.06 J		su	1	08/08/18 10:47	AC	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A60(0.0-0.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-7		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2 J	0.47	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	480		mv	1	08/08/18 12:14	AC	ASTM D1498-76M
Solids, Percent	85.6		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.36 J		su	1	08/08/18 10:53	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A60(2.0-2.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-8	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J	0.45	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	437		mv	1	08/08/18 12:25	AC	ASTM D1498-76M
Solids, Percent	88.1		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.10 J		su	1	08/08/18 10:56	AC	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A60(4.0-4.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-9	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.5 J	0.48	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	481		mv	1	08/08/18 12:29	AC	ASTM D1498-76M
Solids, Percent	84.2		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.62 J		su	1	08/08/18 11:54	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A60(6.0-6.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-10	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J	0.49	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	472		mv	1	08/08/18 12:39	AC	ASTM D1498-76M
Solids, Percent	82.1		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.00 J		su	1	08/08/18 11:59	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H5T	Date Sampled: 08/01/18
Lab Sample ID: JC71067-11	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68 J	0.48	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	453		mv	1	08/08/18 12:46	AC	ASTM D1498-76M
Solids, Percent	82.5		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.28 J		su	1	08/08/18 12:20	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(0.0-0.5) Lab Sample ID: JC71067-12 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 84.6
---	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.8 J	0.47	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	579		mv	1	08/08/18 12:59	AC	ASTM D1498-76M
Solids, Percent	84.6		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.42 J		su	1	08/08/18 12:25	AC	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A59(2.0-2.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-13	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.8 J	0.46	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	447		mv	1	08/08/18 13:16	AC	ASTM D1498-76M
Solids, Percent	87.2		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.82 J		su	1	08/08/18 12:28	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(4.0-4.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-14	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.45	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	455		mv	1	08/08/18 13:21	AC	ASTM D1498-76M
Solids, Percent	88		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.61 J		su	1	08/08/18 12:32	AC	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A59(6.0-6.5)	Date Sampled: 08/01/18
Lab Sample ID: JC71067-15	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9 J	0.51	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	446		mv	1	08/08/18 13:24	AC	ASTM D1498-76M
Solids, Percent	78.4		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.95 J		su	1	08/08/18 12:43	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I5T	Date Sampled: 08/01/18
Lab Sample ID: JC71067-16	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J	0.49	mg/kg	1	08/06/18 17:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	463		mv	1	08/08/18 13:26	AC	ASTM D1498-76M
Solids, Percent	81.2		%	1	08/02/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.96 J		su	1	08/08/18 12:59	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180801)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-1A		Date Received: 08/01/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/02/18	08/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/02/18	08/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/02/18	08/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/02/18	08/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/02/18	08/03/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45008

(2) Prep QC Batch: MP8430

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180801)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-1A		Date Received: 08/01/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/03/18 04:51	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A61(0.0-0.5) Lab Sample ID: JC71067-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 83.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	29.9	1.1	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.8	4.6	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.3	5.7	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A61(0.0-0.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-2A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.0	1.6	mg/kg	1	08/06/18 16:09	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A61(2.0-2.5) Lab Sample ID: JC71067-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 82.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.1	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.7	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.7	5.9	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A61(2.0-2.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-3A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.8	1.7	mg/kg	1	08/06/18 16:13	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A61(4.0-4.5) Lab Sample ID: JC71067-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 86.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	26.2	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.6	4.6	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	5.8	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A61(4.0-4.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-4A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.8	1.7	mg/kg	1	08/06/18 16:13	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A61(6.0-6.5) Lab Sample ID: JC71067-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 78.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	39.8	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.9	4.9	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.6	6.1	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A61(6.0-6.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-5A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.1	1.7	mg/kg	1	08/06/18 16:13	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-G5T		Date Sampled: 08/01/18
Lab Sample ID: JC71067-6A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	82.3	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.4	4.9	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	6.1	mg/kg	1	08/02/18	08/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G5T		Date Sampled: 08/01/18
Lab Sample ID: JC71067-6A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	77.1	1.7	mg/kg	1	08/06/18 16:13	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A60(0.0-0.5) Lab Sample ID: JC71067-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 85.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	117	1.1	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	20.5	4.5	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	36.1	5.6	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A60(0.0-0.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-7A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	113	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A60(2.0-2.5) Lab Sample ID: JC71067-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 88.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/03/18	08/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.1	1.1	mg/kg	1	08/03/18	08/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.2	4.5	mg/kg	1	08/03/18	08/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/03/18	08/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.0	5.7	mg/kg	1	08/03/18	08/03/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45014

(2) Prep QC Batch: MP8445

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A60(2.0-2.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-8A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.0	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A60(4.0-4.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-9A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.0	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	20.5	4.6	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	40.1	5.7	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A60(4.0-4.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-9A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.5	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A60(6.0-6.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-10A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.7	1.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.1	5.0	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.4	6.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A60(6.0-6.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-10A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.7	1.7	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H5T		Date Sampled: 08/01/18
Lab Sample ID: JC71067-11A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	20.5	1.2	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	15.3	4.7	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	26.0	5.9	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H5T	Date Sampled: 08/01/18
Lab Sample ID: JC71067-11A	Date Received: 08/01/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.8	1.7	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(0.0-0.5) Lab Sample ID: JC71067-12A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 84.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	786	1.1	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	73.8	4.5	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	103	5.6	mg/kg	1	08/02/18	08/03/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A59(0.0-0.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-12A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	771	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(2.0-2.5) Lab Sample ID: JC71067-13A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 87.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	27.2	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.6	4.5	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.5	5.6	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(2.0-2.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-13A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.13
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.4	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(4.0-4.5) Lab Sample ID: JC71067-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 88.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.4	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.7	4.5	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.2	5.7	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A59(4.0-4.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-14A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.1	1.6	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A59(6.0-6.5) Lab Sample ID: JC71067-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/18 Date Received: 08/01/18 Percent Solids: 78.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	55.4	1.3	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.3	5.1	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	35.8	6.3	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-A59(6.0-6.5)		Date Sampled: 08/01/18
Lab Sample ID: JC71067-15A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	53.5	1.8	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I5T		Date Sampled: 08/01/18
Lab Sample ID: JC71067-16A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.5	1.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.9	4.8	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.8	6.0	mg/kg	1	08/02/18	08/03/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45010

(2) Prep QC Batch: MP8429

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I5T		Date Sampled: 08/01/18
Lab Sample ID: JC71067-16A		Date Received: 08/01/18
Matrix: SO - Soil		Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.3	1.7	mg/kg	1	08/06/18 17:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC71184, JC71368, JC71451, JC71526, and JC71706

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30554R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC71184, JC71368, JC71451, JC71526, and JC71706 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC71184	FB (20180802)	JC71184-1	Water	8/2/2018		X	X	X
	BS-E7B	JC71184-2	Soil	8/2/2018		X		X
	BS-H5	JC71184-3	Soil	8/2/2018		X	X	X
	BS-I5	JC71184-4	Soil	8/2/2018		X	X	X
	BS-I6	JC71184-5	Soil	8/2/2018		X	X	X
	BS-H6	JC71184-6	Soil	8/2/2018		X	X	X
	DUP-9 (20180802)	JC71184-7	Soil	8/2/2018	BS-I5	X	X	X
JC71368	FB (20180806)	JC71368-1	Water	8/6/2018		X	X	X
	BS-G5	JC71368-2	Soil	8/6/2018		X	X	X
JC71451	FB (20180807)	JC71451-1	Water	8/7/2018		X	X	X
	BS-H7	JC71451-2	Soil	8/7/2018		X	X	X
	BS-G7	JC71451-3	Soil	8/7/2018		X	X	X
JC71526	BS-G6	JC71526-1	Soil	8/8/2018			X	
	BS-H6T	JC71526-2	Soil	8/8/2018		X	X	X
	BS-I6T	JC71526-3	Soil	8/8/2018		X	X	X
	FB (20180808)	JC71526-4	Water	8/8/2018		X	X	X
JC71706	BS-G6A	JC71706-1	Soil	8/10/2018		X	X	X
	BS-G7A	JC71706-2	Soil	8/10/2018		X	X	X
	BS-H7A	JC71706-3	Soil	8/10/2018		X	X	X
	FB (081018)	JC71706-4	Water	8/10/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC71368, JC71451, JC71526, and JC71706: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC71184: The MS/MSD analysis performed on sample location BS-H5 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H5	Antimony	53.0%	55.3%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC71184: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-H5. The MS/MSD recoveries exhibited acceptable RPDs.

SDGs #JC71368, JC71451, JC71526, and JC71706: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-I5 / DUP-9 (20180802)	Chromium	17.8	19.6	9.6%
	Vanadium	29.4	29.5	0.3%
	Trivalent Chromium	16.4	18.0	9.3%
	Nickel	14.0	13.6	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-I5 and field duplicate sample DUP-9 (20180802) were acceptable.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS/LCSD analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDG #JC71184: The serial dilution performed on sample location BS-H5 exhibited %D within control limits.

DATA REVIEW REPORT

SDGs #JC71368, JC71451, JC71526, and JC71706: The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC71184, JC71368, JC71451, and JC71706: The MS analysis performed on sample locations BS-H5, BS-G5, BS-H7, and BS-G6A in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC71526: The MS analysis was not performed using a sample from this SDG.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC71184, JC71368, JC71451, and JC71706: The PDS analysis performed on sample locations BS-H5, BS-G5, BS-H7, and BS-G6A exhibited recoveries within the control limits.

SDG #JC71526: The PDS analysis was not performed using a sample from this SDG.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC71184, JC71368, JC71451, and JC71706: The laboratory duplicate analysis performed on sample locations BS-H5, BS-G5, BS-H7, and BS-G6A exhibited results within the control limit.

SDG #JC71526: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-I5 / DUP-9 (20180802)	Hexavalent Chromium	1.4	1.6	AC

Notes:

AC = Acceptable

The differences in the hexavalent chromium results between the parent sample BS-I5 and field duplicate sample DUP-9 (20180802) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

SDGs #JC71184 and JC71451: All samples were analyzed within the specified holding times.

SDGs #JC71368, JC71526, and JC71706: The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-G5	SW846 9045D	Analysis: 3 days	< 24 hours of receipt at laboratory
BS-H6T BS-I6T BS-G6A BS-G7A BS-H7A	SW846 9045D	Analysis: 2 days	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

DATA REVIEW REPORT

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC71184, JC71526, and JC71706: The laboratory duplicate analysis performed on sample locations BS-H5, BS-H6T, and FB (081018) exhibited results within the control limit.

SDGs #JC71368 and JC71541: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-I5 / DUP-9 (20180802)	Redox Potential	222	306	31.8%
	pH	9.27	8.81	5.1%

The differences in the results between the parent sample BS-I5 and field duplicate sample DUP-9 (20180802) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: September 10, 2018

PEER REVIEW: Dennis Capria

DATE: September 25, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsus

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **2507238-125**
SGS Job # **JC71184**

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes										
Company Name ARCADIS		Project Name PRG JERSEY CITY SITE 107												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank										
Street Address 10 FRIENDS LANE SUITE 200		Street 18 CHAPEL AVE																						
City NEWTON NJ		City JERSEY CITY NJ																						
Project Contact KRISTA MASTROCOLA		Project # NP000770.0001.00015																						
Phone # 610-755-7080		Client Purchase Order #																						
Sampler(s) Name(s) CHRISTIN CIFELLI		Project Manager Jim McLaughlin																						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection		Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY						
			Date	Time				HCl	MeOH	HN03	H2SO4	NONE	DI Water	MEOH	ENCORE	Total Chromium	Hexavalent Chromium		Trivalent Chromium	Antimony	Nickel	Tallium	Vanadium	
1	FB(20180802)		8/2/18	0555	CC	FB	4																	A27
	BS-H6		8/2/18	1345	CC	SO	1																	C10
2	BS-E7B		8/2/18	1315	CC	SO	1																	B6
	BS-H5		8/2/18	1330	CC	SO	1																	
3	BS-H5 MS		8/2/18	1370	CC	SO	1																	
	BS-H5 MSD		8/2/18	1330	CC	SO	1																	
4	BS-IS		8/2/18	1335	CC	SO	1																	
5	BS-IG		8/2/18	1340	CC	SO	1																	
6	BS-H6		8/2/18	1345	CC	SO	1																	
7	DUP-4(20180802)		8/2/18	-	CC	SO	1																	

5.2
5

Turnaround Time (Business days)		Approved by (SGS Project Manager) Date:		Data Deliverable Information										Comments / Special Instructions		
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										INITIAL ASSESSMENT <i>JL3B</i> LABEL VERIFICATION		
Emergency & Rush T/A data available via LabLink													Sample inventory is verified upon receipt in the Laboratory			
Sample Custody must be documented below each time samples change possession, including courier delivery.																
1	Relinquished by Sampler: <i>CC</i>	Date/Time: 8/2/18 1420	Received By: <i>Justin Jones</i>	2	Relinquished By: <i>Justin Jones</i>	Date/Time: 8/2/18 1705	Received By: <i>A</i>									
3	Relinquished by Sampler:	Date/Time:	Received By:	4	Relinquished By:	Date/Time:	Received By:									
5	Relinquished by:	Date/Time:	Received By:	5	Custody Seal # 07386	Intact <input checked="" type="checkbox"/>	Not Intact <input type="checkbox"/>	Preserved where applicable <input type="checkbox"/>							On Ice <input checked="" type="checkbox"/> Cooler Temp. 02.8°C	

Report of Analysis

Client Sample ID: FB(20180802)	Date Sampled: 08/02/18
Lab Sample ID: JC71184-1	Date Received: 08/02/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/02/18 21:20	LS	SW846 7196A
Redox Potential Vs H2	462		mv	1	08/03/18 09:27	AC	ASTM D1498-76
pH ^a	5.30		su	1	08/02/18 18:30	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E7B	Date Sampled: 08/02/18
Lab Sample ID: JC71184-2	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71	0.45	mg/kg	1	08/06/18 11:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	269		mv	1	08/03/18 10:51	AC	ASTM D1498-76M
Solids, Percent	89.5		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	6.72		su	1	08/03/18 10:36	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H5	Date Sampled: 08/02/18
Lab Sample ID: JC71184-3	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.44	mg/kg	1	08/06/18 11:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	255		mv	1	08/03/18 11:02	AC	ASTM D1498-76M
Solids, Percent	90.2		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.52		su	1	08/03/18 10:42	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I5	Date Sampled: 08/02/18
Lab Sample ID: JC71184-4	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.46	mg/kg	1	08/06/18 11:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	222		mv	1	08/03/18 11:08	AC	ASTM D1498-76M
Solids, Percent	86.5		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	9.27		su	1	08/03/18 10:51	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I6	Date Sampled: 08/02/18
Lab Sample ID: JC71184-5	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.4	0.46	mg/kg	1	08/06/18 11:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	368		mv	1	08/03/18 11:15	AC	ASTM D1498-76M
Solids, Percent	87.1		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	6.78		su	1	08/03/18 11:02	AC	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-H6	Date Sampled: 08/02/18
Lab Sample ID: JC71184-6	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0	0.47	mg/kg	1	08/06/18 11:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	386		mv	1	08/03/18 11:30	AC	ASTM D1498-76M
Solids, Percent	85.7		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	6.89		su	1	08/03/18 11:08	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-9(20180802)	Date Sampled: 08/02/18
Lab Sample ID: JC71184-7	Date Received: 08/02/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.46	mg/kg	1	08/06/18 11:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	306		mv	1	08/03/18 11:36	AC	ASTM D1498-76M
Solids, Percent	87.8		%	1	08/03/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.81		su	1	08/03/18 11:15	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20180802)		Date Sampled: 08/02/18
Lab Sample ID: JC71184-1A		Date Received: 08/02/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/03/18	08/04/18	GT SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/03/18	08/04/18	GT SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/03/18	08/04/18	GT SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/03/18	08/04/18	GT SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/03/18	08/04/18	GT SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45018

(2) Prep QC Batch: MP8451

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180802)		Date Sampled: 08/02/18
Lab Sample ID: JC71184-1A		Date Received: 08/02/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/04/18 05:40	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H5		Date Sampled: 08/02/18
Lab Sample ID: JC71184-3A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	25.8	1.1	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	16.4	4.4	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.8	5.5	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45020

(2) Prep QC Batch: MP8452

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H5		Date Sampled: 08/02/18
Lab Sample ID: JC71184-3A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 90.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.3	1.5	mg/kg	1	08/06/18 11:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I5		Date Sampled: 08/02/18
Lab Sample ID: JC71184-4A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	17.8	1.2	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.6	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	5.8	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45020

(2) Prep QC Batch: MP8452

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-15		Date Sampled: 08/02/18
Lab Sample ID: JC71184-4A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.4	1.7	mg/kg	1	08/06/18 11:54	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I6		Date Sampled: 08/02/18
Lab Sample ID: JC71184-5A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	38.6	1.2	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.4	4.7	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.6	5.9	mg/kg	1	08/03/18	08/05/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45020

(2) Prep QC Batch: MP8452

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I6		Date Sampled: 08/02/18
Lab Sample ID: JC71184-5A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	35.2	1.7	mg/kg	1	08/06/18 11:54	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H6		Date Sampled: 08/02/18
Lab Sample ID: JC71184-6A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	53.9	1.1	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.5	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.6	5.6	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45020

(2) Prep QC Batch: MP8452

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H6		Date Sampled: 08/02/18
Lab Sample ID: JC71184-6A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	47.9	1.6	mg/kg	1	08/06/18 11:54	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-9(20180802) Lab Sample ID: JC71184-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/02/18 Date Received: 08/02/18 Percent Solids: 87.8
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	19.6	1.1	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.6	4.4	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	29.5	5.5	mg/kg	1	08/03/18	08/05/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45020

(2) Prep QC Batch: MP8452

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-9(20180802)		Date Sampled: 08/02/18
Lab Sample ID: JC71184-7A		Date Received: 08/02/18
Matrix: SO - Soil		Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.6	mg/kg	1	08/06/18 11:54	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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FED-EX Tracking #
SGS Quote #
SGS Order Control # **LS-677318-126**
SGS Job # **JC71368**

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes	
Company Name Accardi		Project Name PPG Jersey City Site 107				Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium										SW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Avenue															
City State Zip Newton PA 18440		City State Jersey City NJ															
Project Contact Krista Mastrocola		Project # NP000770.0001.00008															
Phone # 610.755.7080		Client Purchase Order #															
Sampler(s) Name(s) Christa C. Galli		Project Manager Jim McLaglin															
Lab Sample #	Field ID / Point of Collection	MEOH/IDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	HNO2	HNO3	DI Water	MEOH	ENCLOSURE	LAB USE ONLY
1	FB(20180806)		8/6/18	0550	CC	FB	4			2							X
2	BS-G5		8/6/18	0930	CC	SO	1										X

5.2
5

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Eqv <input type="checkbox"/> Other	
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory			

Relinquished by Sampler: 1 [Signature]	Date/Time: 8/6/18 1404	Received By: 1 [Signature]	Date/Time: 8/6/18 1600	Relinquished by: 2 [Signature]	Date/Time: 8/6/18 1600	Received By: 2 [Signature]	Date/Time: 8/6/18 1600	
Relinquished by Sampler: 3	Date/Time:	Received By: 3	Date/Time:	Relinquished by: 4	Date/Time:	Received By: 4	Date/Time:	
Relinquished by: 5	Date/Time:	Received By: 5	Date/Time:	Custody Seal # 03384	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp. 2.8 °C



Report of Analysis

Client Sample ID: FB(20180806)		Date Sampled: 08/06/18
Lab Sample ID: JC71368-1		Date Received: 08/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/06/18 22:00	LS	SW846 7196A
Redox Potential Vs H2	475		mv	1	08/07/18 16:08	AC	ASTM D1498-76
pH ^a	5.86		su	1	08/06/18 16:35	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G5		Date Sampled: 08/06/18
Lab Sample ID: JC71368-2		Date Received: 08/06/18
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.9	0.45	mg/kg	1	08/08/18 15:37	RI	SW846 3060A/7196A
Redox Potential Vs H2	306		mv	1	08/08/18 15:18	AC	ASTM D1498-76M
Solids, Percent	89.8		%	1	08/07/18 13:20	LV	SM2540 G 18TH ED MOD
pH	6.67 J		su	1	08/08/18 14:50	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180806)		Date Sampled: 08/06/18
Lab Sample ID: JC71368-1A		Date Received: 08/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/07/18	08/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/07/18	08/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/07/18	08/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/07/18	08/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/07/18	08/07/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45034

(2) Prep QC Batch: MP8499

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180806)		Date Sampled: 08/06/18
Lab Sample ID: JC71368-1A		Date Received: 08/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/07/18 18:18	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G5		Date Sampled: 08/06/18
Lab Sample ID: JC71368-2A		Date Received: 08/06/18
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/07/18	08/07/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.9	1.1	mg/kg	1	08/07/18	08/07/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.4	mg/kg	1	08/07/18	08/07/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/07/18	08/07/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.1	5.4	mg/kg	1	08/07/18	08/07/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45034

(2) Prep QC Batch: MP8500

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G5		Date Sampled: 08/06/18
Lab Sample ID: JC71368-2A		Date Received: 08/06/18
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.0	1.6	mg/kg	1	08/08/18 15:37	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusua

FED-EX Tracking #
SGS Order Control # **15-072318-128**
SGS Quote #
SGS Job # **JC71451**

Client / Reporting Information			Project Information										Requested Analysis (see TEST CODE sheet)						Matrix Codes						
Company Name ARCADIS			Project Name PPG Site 107 - JERSEY CITY										TOTAL CHROMIUM HEXAVALENT CHROMIUM TRIVALENT CHROMIUM ANTIMONY THALLIUM VAUDIUM						DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank						
Street Address 10 FRIENDS LANE SUITE 200			Street 18 CHAPEL AVE																						
City NEWTOWN PA			City JERSEY CITY NJ																						
Project Contact KRISTIA MASTROKOLA			Project # NP000770.0001.0005																						
Phone # 610.755.7080			Client Purchase Order #																						
Sampler(s) Name(s) CYNTHIA BUCHANAN			Project Manager J. McLAUGHLIN																						
Lab Sample #			Collection																LAB USE ONLY						
Field ID / Point of Collection			MEOH/DI Vial #																						
Date			Time																						
Sampled by			Matrix																						
# of bottles			HCl																						
NaOH			HNO3																						
H2SO4			H3PO4																						
DI Water			MEQ#																						
ENCORE																									
1			FB(20180807)																A5						
2			BS-H7																G58						
3			BS-H8																C62						
Turnaround Time (Business days)			Data Deliverable Information																Comments / Special Instructions						
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other			Approved by (SGS Project Manager)/Date:										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULL T1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data						<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUS <input type="checkbox"/> Other						INITIAL ASSESSMENT JR3A LABEL VERIFICATION
Emergency & Rush TIA data available via LabLink			Sample inventory is verified upon receipt in the Laboratory																						
Relinquished By: [Signature]			Date Time: 8/7/18 1430										Received By: [Signature]						Date Time: 8/7/18						
Relinquished By: [Signature]			Date Time: 8/7/18										Received By: [Signature]						Date Time: 8/7/18						
Relinquished By: [Signature]			Date Time: 8/7/18										Received By: [Signature]						Date Time: 8/7/18						
Custody Seal # 0830808			<input type="checkbox"/> Intact <input type="checkbox"/> Not intact										Preserved where applicable						On Ice <input checked="" type="checkbox"/>						

5.2
5



Report of Analysis

Client Sample ID: FB(20180807) Lab Sample ID: JC71451-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/07/18 Date Received: 08/07/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/07/18 22:55	LS	SW846 7196A
Redox Potential Vs H2	469		mv	1	08/08/18 10:16	AC	ASTM D1498-76
pH ^a	5.87		su	1	08/07/18 17:08	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H7		Date Sampled: 08/07/18
Lab Sample ID: JC71451-2		Date Received: 08/07/18
Matrix: SO - Soil		Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	13.1	0.47	mg/kg	1	08/09/18 13:25	RI	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	08/08/18 15:27	AC	ASTM D1498-76M
Solids, Percent	85.1		%	1	08/08/18 10:20	RC	SM2540 G 18TH ED MOD
pH	7.74		su	1	08/08/18 14:59	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G7	Date Sampled: 08/07/18
Lab Sample ID: JC71451-3	Date Received: 08/07/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	109	2.4	mg/kg	5	08/09/18 13:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	351		mv	1	08/08/18 15:31	AC	ASTM D1498-76M
Solids, Percent	84.6		%	1	08/08/18 10:20	RC	SM2540 G 18TH ED MOD
pH	7.43		su	1	08/08/18 15:02	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180807)		Date Sampled: 08/07/18
Lab Sample ID: JC71451-1A		Date Received: 08/07/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45044

(2) Prep QC Batch: MP8520

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180807)	Date Sampled: 08/07/18
Lab Sample ID: JC71451-1A	Date Received: 08/07/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/08/18 20:11	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H7		Date Sampled: 08/07/18
Lab Sample ID: JC71451-2A		Date Received: 08/07/18
Matrix: SO - Soil		Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	162	1.2	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	6.0	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45042

(2) Prep QC Batch: MP8521

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7		Date Sampled: 08/07/18
Lab Sample ID: JC71451-2A		Date Received: 08/07/18
Matrix: SO - Soil		Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	149	1.7	mg/kg	1	08/09/18 13:25	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G7		Date Sampled: 08/07/18
Lab Sample ID: JC71451-3A		Date Received: 08/07/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	259	1.2	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	5.8	mg/kg	1	08/08/18	08/08/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45042

(2) Prep QC Batch: MP8521

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G7		Date Sampled: 08/07/18
Lab Sample ID: JC71451-3A		Date Received: 08/07/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	150	3.6	mg/kg	1	08/09/18 13:28	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
SGS Quote #
Bond Order Code: **15-072318-123**
SGS Job #: **JC71526**

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes										
Company Name Arcaets		Project Name: PPG Jersey City Site 107										Total chromium Hexavalent chromium Trivalent chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SE - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB-Field Blank EB-Equipment Blank RB- Rinse Blank TB-Trip Blank										
Street Address 10 Friends Lane Ste 200		Street 18 Chapel Ave																											
City, State, Zip Newtown, PA 18440		City, State Jersey City, NJ																											
Project Contact Krista Mastrocola		Project # NP000770-0001-00005																											
Phone # 610-755-7080		Client Purchase Order #										LAB USE ONLY																	
Sampler(s) Name(s) G Quinones		Project Manager Jim McLaughlin																											
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		HCl		NaOH		HNO3		H2SO4		H2O2		MEOH		ENCLOSURE	
1		BS-G6				8-8-18		0630		GR		SD		1															
2		BS-H6T				8-8-18		0640		GR		SD		1															
3		BS-I6T				8-8-18		0645		GR		SD		1															
4		FB(20180808)				8-8-18		0930		GR		AQ		4		2		2											
Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions																	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data							<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Egms <input type="checkbox"/> Other INITIAL ASSESSMENT <i>EGMS</i> LABEL VERIFICATION										
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory is verified upon receipt in the Laboratory																	
Relinquished by Sampler <i>[Signature]</i>		Date Time: 8-8-18		Received By: [Signature]		Date Time: 8/8/18 200		Relinquished By: [Signature]		Date Time: 8/8/18		Received By: [Signature]		Date Time: 7000		Received By: [Signature]													
Relinquished by Sampler 3		Date Time:		Received By: 3		Date Time:		Relinquished By: 4		Date Time:		Received By: 4		Date Time:		Received By: 4													
Relinquished by: 5		Date Time:		Received By: 5		Date Time:		Custody Seal # 08126		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable <input type="checkbox"/>		On Ice <input checked="" type="checkbox"/>		Cooler Temp. CID													

5.2
5



Report of Analysis

Client Sample ID: BS-H6T	Date Sampled: 08/08/18
Lab Sample ID: JC71526-2	Date Received: 08/08/18
Matrix: SO - Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.2	0.55	mg/kg	1	08/10/18 15:45	RI	SW846 3060A/7196A
Redox Potential Vs H2	358		mv	1	08/10/18 11:25	RI	ASTM D1498-76M
pH	7.32 J		su	1	08/10/18 11:05	RI	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I6T		Date Sampled: 08/08/18
Lab Sample ID: JC71526-3		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	15.8	0.61	mg/kg	1	08/10/18 15:45	RI	SW846 3060A/7196A
Redox Potential Vs H2	335		mv	1	08/10/18 11:31	RI	ASTM D1498-76M
pH	7.55 J		su	1	08/10/18 11:10	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180808) Lab Sample ID: JC71526-4 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/08/18 Date Received: 08/08/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/08/18 23:37	LS	SW846 7196A
Redox Potential Vs H2	448		mv	1	08/09/18 20:34	JO	ASTM D1498-76
pH ^a	5.92		su	1	08/08/18 17:19	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G6		Date Sampled: 08/08/18
Lab Sample ID: JC71526-1A		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: 81.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	70.2	1.2	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.1	4.8	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.8	6.0	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45048

(2) Prep QC Batch: MP8537

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G6		Date Sampled: 08/08/18
Lab Sample ID: JC71526-1A		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: 81.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	53.8	1.7	mg/kg	1	08/10/18 15:42	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H6T		Date Sampled: 08/08/18
Lab Sample ID: JC71526-2A		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: 72.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	61.9	1.4	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	19.0	5.7	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.7	7.2	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45048

(2) Prep QC Batch: MP8537

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H6T	Date Sampled: 08/08/18
Lab Sample ID: JC71526-2A	Date Received: 08/08/18
Matrix: SO - Soil	Percent Solids: 72.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	55.7	2.0	mg/kg	1	08/10/18 15:45	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I6T		Date Sampled: 08/08/18
Lab Sample ID: JC71526-3A		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: 66.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	183	1.5	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	24.4	6.0	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	68.5	7.5	mg/kg	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45048

(2) Prep QC Batch: MP8537

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I6T		Date Sampled: 08/08/18
Lab Sample ID: JC71526-3A		Date Received: 08/08/18
Matrix: SO - Soil		Percent Solids: 66.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	167	2.1	mg/kg	1	08/10/18 15:45	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180808) Lab Sample ID: JC71526-4A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/08/18 Date Received: 08/08/18 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/09/18	08/09/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45046

(2) Prep QC Batch: MP8527

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20180808)	Date Sampled: 08/08/18
Lab Sample ID: JC71526-4A	Date Received: 08/08/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/09/18 18:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

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SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking # _____
SGS Quote # _____
Order Control # **011318-35**
SGS Job # **JC71706**

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes																
Company Name ARCADIS		Project Name PPG JERSEY CITY SITE 107										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	Matrix Codes																
Street Address 10 FRIENDS LANE SUITE 200		Street 18 CHAPEL AVE		Billing Information (if different from Report to)						DW - Drinking Water	GW - Ground Water								WW - Water	SW - Surface Water	SO - Soil	SL - Sludge	SED - Sediment	OI - Oil	LIQ - Other Liquid	AIR - Air	SOL - Other Solid	WP - Wipe	FB-Field Blank	EB - Equipment Blank	RB - Rinse Blank	TB - Trip Blank			
City, State, Zip NEWTOWN PA 18440		City, State JERSEY CITY NJ		Company Name						LAB USE ONLY																									
Project Contact VELISTA MASTROCOLA		Project # NP000770-0001-00009		Street Address																															
Phone # 610-755-7080		Client Purchase Order #		City, State, Zip																															
Sampler(s) Name(s) JIM McLAUGHLIN		Phone # 2158151030		Project Manager JIM McLAUGHLIN		Attention:																													
Lab Sample #	Field ID / Point of Collection	MEOH/IDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NO ₂ H	NO ₃ H	H ₂ SO ₄	NONE	DI Water	MEOH	ENCORE																				
1	BS-G6A		8-10-18	1229	JM	So	1										X	X	X	X	X	X	X	X	X	X	X	A19							
2	BS-G7A		8-10-18	1235	JM	So	1										X	X	X	X	X	X	X	X	X	X	X	M18							
3	BS-H7A		8-10-18	1242	JM	So	1										X	X	X	X	X	X	X	X	X	X	X	D22							
	FB(20181028) (CB)		8-10-18	1415	JM	FB	4										X	X	X	X	X	X	X	X	X	X									
4	FB(081018)		8-10-18	1415	JM	FB	4				2	2					X	X	X	X	X	X	X	X	X	X									

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions								
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format EQUIS <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting										INITIAL ASSESSMENT CB LABEL VERIFICATION _____						
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										Sample inventory is verified upon receipt in the Laboratory								

Sample Custody must be documented below each time samples change possession, including courier delivery.									
Relinquished by Sampler: [Signature]	Date Time: 8/10/18 1430	Received By: [Signature]	Date Time: 8/10/18 1600	Relinquished by: [Signature]	Date Time: 8/10/18	Received By: [Signature]	Relinquished by: [Signature]	Date Time: 8/10/18	Received By: [Signature]
Relinquished by Sampler: [Signature]	Date Time:	Received By:	Date Time:	Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
Relinquished by:	Date Time:	Received By:	Date Time:	Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:

Custody Seal # **05108** Intact Not intact Preserved where applicable On Ice Cooler Temp. **5.0°C-B**

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.



5.2
5

Report of Analysis

Client Sample ID: BS-G6A	Date Sampled: 08/10/18
Lab Sample ID: JC71706-1	Date Received: 08/10/18
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.2	0.46	mg/kg	1	08/14/18 15:12	RI	SW846 3060A/7196A
Redox Potential Vs H2	209		mv	1	08/12/18 16:14	CB	ASTM D1498-76M
Solids, Percent	87.7		%	1	08/13/18 09:15	RC	SM2540 G 18TH ED MOD
pH	10.00 J		su	1	08/12/18 14:34	CB	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G7A	Date Sampled: 08/10/18
Lab Sample ID: JC71706-2	Date Received: 08/10/18
Matrix: SO - Soil	Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71	0.45	mg/kg	1	08/14/18 15:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	278		mv	1	08/12/18 16:14	CB	ASTM D1498-76M
Solids, Percent	88.8		%	1	08/13/18 09:15	RC	SM2540 G 18TH ED MOD
pH	8.05 J		su	1	08/12/18 14:34	CB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7A	Date Sampled: 08/10/18
Lab Sample ID: JC71706-3	Date Received: 08/10/18
Matrix: SO - Soil	Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	32.1	0.47	mg/kg	1	08/14/18 15:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	08/12/18 16:14	CB	ASTM D1498-76M
Solids, Percent	85.1		%	1	08/13/18 09:15	RC	SM2540 G 18TH ED MOD
pH	7.36 J		su	1	08/12/18 14:34	CB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(081018) Lab Sample ID: JC71706-4 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/10/18 Date Received: 08/10/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/10/18 20:03	LS	SW846 7196A
Redox Potential Vs H2	417		mv	1	08/12/18 16:41	CB	ASTM D1498-76
pH ^a	5.76		su	1	08/10/18 17:00	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G6A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-1A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	31.2	1.1	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.2	4.5	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.9	5.6	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45068

(2) Prep QC Batch: MP8592

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G6A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-1A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.0	1.6	mg/kg	1	08/14/18 15:12	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G7A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-2A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	11.4	1.1	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	10.3	4.5	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.1	5.6	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45068

(2) Prep QC Batch: MP8592

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G7A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-2A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.7	1.6	mg/kg	1	08/14/18 15:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-3A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	56.9	1.2	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.6	4.6	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.1	5.8	mg/kg	1	08/12/18	08/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45068

(2) Prep QC Batch: MP8592

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H7A		Date Sampled: 08/10/18
Lab Sample ID: JC71706-3A		Date Received: 08/10/18
Matrix: SO - Soil		Percent Solids: 85.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.8	1.7	mg/kg	1	08/14/18 15:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(081018) Lab Sample ID: JC71706-4A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/10/18 Date Received: 08/10/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/12/18	08/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/12/18	08/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/12/18	08/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/12/18	08/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/12/18	08/13/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45068

(2) Prep QC Batch: MP8589

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(081018)	Date Sampled: 08/10/18
Lab Sample ID: JC71706-4A	Date Received: 08/10/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/13/18 21:15	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC71945, JC72118, JC72252, and JC72335

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30555R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC71945, JC72118, JC72252, and JC72335 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC71945	BS-F9	JC71945-1	Soil	8/15/2018		X	X	X
	BS-E9	JC71945-2	Soil	8/15/2018		X	X	X
	BS-H7B	JC71945-3	Soil	8/15/2018		X	X	X
	BS-G8	JC71945-4	Soil	8/15/2018		X	X	X
	BS-H8	JC71945-5	Soil	8/15/2018		X	X	X
	FB (20180815)	JC71945-6	Water	8/15/2018		X	X	X
JC72118	BS-G9	JC72118-1	Soil	8/17/2018		X	X	X
	DUP-1 (20180817)	JC72118-2	Soil	8/17/2018	BS-G9	X	X	X
	BS-H9	JC72118-3	Soil	8/17/2018		X	X	X
	FB (20180817)	JC72118-5	Water	8/17/2018		X	X	X
JC72252	BS-H7C	JC72252-1	Soil	8/21/2018		X	X	X
	FB (20180821)	JC72252-2	Water	8/21/2018		X	X	X
JC72335	BS-C10	JC72335-1	Soil	8/22/2018		X	X	X
	BS-D10	JC72335-2	Soil	8/22/2018		X	X	X
	FB (20180822)	JC72335-3	Water	8/22/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC71945 and JC72335: Miscellaneous parameters for samples BS-F9 and BS-C10 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G9 / DUP-1 (20180817)	Chromium	19.4	18.3	5.8%
	Nickel	44.4	43.4	2.3%
	Trivalent Chromium	19.4	18.3	5.8%
	Vanadium	24.2	21.9	AC

Notes:

AC = Acceptable

DATA REVIEW REPORT

The differences in the results between the parent sample BS-G9 and field duplicate sample DUP-1 (20180817) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC72118 and JC72252: The MS analysis performed on sample locations BS-H9 and BS-H7C in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC71945 and JC72335: The MS analysis performed on sample locations BS-F9 and BS-C10 exhibited insoluble and soluble hexavalent chromium spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-F9	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	55.1%	AC (86.4%)
BS-C10	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	69.4%	74.0%

Notes:

AC Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that

DATA REVIEW REPORT

has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC71945, JC72118, and JC72252: The PDS analysis performed on sample locations BS-F9, BS-H9, and BS-H7C exhibited recoveries within the control limits.

SDG #JC72335: The PDS recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
BS-C10	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC71945, JC72252, and JC72335: The laboratory duplicate analysis performed on sample locations BS-F9, BS-H7C, and BS-C10 exhibited results within the control limit.

SDG #JC72118: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes
BS-H9	Hexavalent Chromium

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G9 / DUP-1 (20180817)	Hexavalent Chromium	0.53 U	0.50 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample BS-G9 and field duplicate sample DUP-1 (20180817).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

SDG #JC72252: All samples were analyzed within the specified holding times.

SDGs #JC71945, JC72118, and JC72335: The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-F9	ASTM D3872-86	Analysis: 5 days	< 24 hours from collection
BS-C10		Analysis: 6 days	
BS-G9 DUP-1 (20180817) BS-H9	SW846 9045D	Analysis: 3 days	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC71945: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC72118, JC72252, and JC72335: The laboratory duplicate analysis performed on sample locations DUP-1 (20180817), FB (20180817), BS-H7C, and BS-C10 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G9 / DUP-1 (20180817)	Redox Potential	297	326	9.3%
	pH	7.05	7.00	0.7%

The differences in the results between the parent sample BS-G9 and field duplicate sample DUP-1 (20180817) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: September 12, 2018

PEER REVIEW: Dennis Capria

DATE: September 25, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

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FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC71945

Company Name ARCADIS		Project Name PPG JERSEY CITY SITE 107		Requested Analysis (see TEST CODE sheet)										Matrix Codes	
Street Address 10 FRIENDS LANE		Street 78 CHAPEL AVE		TOTAL CHROMIUM HEXAVALENT CHROMIUM TRIVALENT CHROMIUM ANTIMONY NICKEL THALLIUM VANADIUM										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LI - LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
City State Zip NEWTOWN PA 18440		City State JERSEY CITY NJ													
Project Contact KRISTA MASTROCOLA		Project # 140000778		Company Name		Street Address		City		State		Zip			
Phone # 610-755-7080		Client Purchase Order #		Attention:											
Sampler(s) Name(s) Cynthia Buchanan		Project Manager JIM McHAUGHLEN													
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles	
1		BS-F9				8-15-18		1330		CB				1	
2		BS-E9				8-15-18		1335		CB				1	
3		BS-H7B				8-15-18		1340		CB				1	
4		BS-G8				8-15-18		1345		CB				1	
5		BS-H8				8-15-18		1350		CB				1	
6		FB (20180815)				8-15-18		1410		CB		4		2 2	

Turnaround Time (Business days)		Approved by (SGS Project Manager) / Date:		Data Deliverable Information										Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other										INITIAL ASSESSMENT 3B (A) LABEL VERIFICATION	

Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory is verified upon receipt in the Laboratory	
Relinquished By: [Signature]		Date Time: 8/15/18 1420		Received By: [Signature]		Date Time: 8/15/18 215		Relinquished By: [Signature]		Date Time: 8/15/18 1730		Received By: [Signature]	
Relinquished By: [Signature]		Date Time: 8/15/18 1420		Received By: [Signature]		Date Time: 8/15/18 215		Relinquished By: [Signature]		Date Time: 8/15/18 1730		Received By: [Signature]	
Relinquished By: [Signature]		Date Time: 8/15/18 1420		Received By: [Signature]		Date Time: 8/15/18 215		Relinquished By: [Signature]		Date Time: 8/15/18 1730		Received By: [Signature]	



5.2
5

3.7

Report of Analysis

Client Sample ID: BS-F9	Date Sampled: 08/15/18
Lab Sample ID: JC71945-1	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79 J-	0.47	mg/kg	1	08/16/18 16:09	RI	SW846 3060A/7196A
Redox Potential Vs H2	297		mv	1	08/16/18 21:40	HS	ASTM D1498-76M
Solids, Percent	85.4		%	1	08/16/18 10:02	RC	SM2540 G 18TH ED MOD
pH	6.63		su	1	08/16/18 21:43	HS	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E9	Date Sampled: 08/15/18
Lab Sample ID: JC71945-2	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.47	mg/kg	1	08/16/18 16:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	329		mv	1	08/16/18 21:43	HS	ASTM D1498-76M
Solids, Percent	84.8		%	1	08/16/18 10:02	RC	SM2540 G 18TH ED MOD
pH	5.82		su	1	08/16/18 21:46	HS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7B	Date Sampled: 08/15/18
Lab Sample ID: JC71945-3	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	49.7 J-	0.49	mg/kg	1	08/16/18 16:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	324		mv	1	08/16/18 21:45	HS	ASTM D1498-76M
Solids, Percent	82.2		%	1	08/16/18 10:02	RC	SM2540 G 18TH ED MOD
pH	7.24		su	1	08/16/18 21:50	HS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G8	Date Sampled: 08/15/18
Lab Sample ID: JC71945-4	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	08/16/18 16:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	255		mv	1	08/16/18 21:55	HS	ASTM D1498-76M
Solids, Percent	83.8		%	1	08/16/18 10:02	RC	SM2540 G 18TH ED MOD
pH	7.47		su	1	08/16/18 21:53	HS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H8	Date Sampled: 08/15/18
Lab Sample ID: JC71945-5	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.0 J-	0.50	mg/kg	1	08/16/18 16:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	295		mv	1	08/16/18 22:01	HS	ASTM D1498-76M
Solids, Percent	80.5		%	1	08/16/18 10:02	RC	SM2540 G 18TH ED MOD
pH	7.88		su	1	08/16/18 21:55	HS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180518)	Date Sampled: 08/15/18
Lab Sample ID: JC71945-6	Date Received: 08/15/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/15/18 20:00	LS	SW846 7196A
Redox Potential Vs H2	398		mv	1	08/16/18 18:02	HS	ASTM D1498-76
pH ^a	6.09		su	1	08/15/18 17:45	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F9		Date Sampled: 08/15/18
Lab Sample ID: JC71945-1A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.8	1.1	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	4.6	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.7	5.7	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45100

(2) Prep QC Batch: MP8670

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F9	Date Sampled: 08/15/18
Lab Sample ID: JC71945-1A	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.0	1.6	mg/kg	1	08/16/18 16:09	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E9		Date Sampled: 08/15/18
Lab Sample ID: JC71945-2A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.0	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.0	4.7	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.5	5.9	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45100

(2) Prep QC Batch: MP8670

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E9		Date Sampled: 08/15/18
Lab Sample ID: JC71945-2A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.7	1.7	mg/kg	1	08/16/18 16:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7B		Date Sampled: 08/15/18
Lab Sample ID: JC71945-3A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	71.1	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.9	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.8	6.1	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45100

(2) Prep QC Batch: MP8670

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H7B		Date Sampled: 08/15/18
Lab Sample ID: JC71945-3A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.4	1.7	mg/kg	1	08/16/18 16:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G8		Date Sampled: 08/15/18
Lab Sample ID: JC71945-4A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	25.3	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.7	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.6	5.9	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45100

(2) Prep QC Batch: MP8670

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G8		Date Sampled: 08/15/18
Lab Sample ID: JC71945-4A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.3	1.7	mg/kg	1	08/16/18 16:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H8		Date Sampled: 08/15/18
Lab Sample ID: JC71945-5A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	185	1.3	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	24.4	5.0	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	47.5	6.3	mg/kg	1	08/16/18	08/16/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45100

(2) Prep QC Batch: MP8670

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-H8		Date Sampled: 08/15/18
Lab Sample ID: JC71945-5A		Date Received: 08/15/18
Matrix: SO - Soil		Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	171	1.8	mg/kg	1	08/16/18 16:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180518)		Date Sampled: 08/15/18
Lab Sample ID: JC71945-6A		Date Received: 08/15/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/16/18	08/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/16/18	08/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/16/18	08/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/16/18	08/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/16/18	08/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45098

(2) Prep QC Batch: MP8669

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180518)		Date Sampled: 08/15/18
Lab Sample ID: JC71945-6A		Date Received: 08/15/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/17/18 00:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F9	Date Sampled: 08/15/18
Lab Sample ID: JC71945-1R	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.47	mg/kg	1	08/20/18 16:19	RI	SW846 3060A/7196A
Iron, Ferrous	0.70 J	0.20	%	1	08/20/18 11:15	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	08/20/18 11:15	ST	SM4500S2- A-11
Total Organic Carbon	53100	120	mg/kg	1	08/17/18 17:55	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E9	Date Sampled: 08/15/18
Lab Sample ID: JC71945-2R	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	08/20/18 16:22	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H7B	Date Sampled: 08/15/18
Lab Sample ID: JC71945-3R	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	45.4	0.49	mg/kg	1	08/20/18 16:22	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G8	Date Sampled: 08/15/18
Lab Sample ID: JC71945-4R	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71	0.48	mg/kg	1	08/20/18 16:22	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H8	Date Sampled: 08/15/18
Lab Sample ID: JC71945-5R	Date Received: 08/15/18
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	17.8	0.50	mg/kg	1	08/20/18 16:22	RI	SW846 3060A/7196A

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/en/usa

FED-EX Tracking #
SGS Quote #
Bottle Control # **DK-073118-35**
SGS Job # **JC72118**

Client / Reporting Information		Project Information		Requested Analysis / See TEST CODE sheet												Matrix Codes																																																																																																																																																																				
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		<table border="1"> <tr><td>Total chromium</td><td>Hexavalent chromium</td><td>Trivalent chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>												Total chromium	Hexavalent chromium	Trivalent chromium	Antimony	Nickel	Thallium	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																																																																																																																																	
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Project Contact: Krista Mastrocola		Project #: NP000170.0001.00005																																																																																																																																																																																		
Phone #: 610-755-7080		Client Purchase Order #:																																																																																																																																																																																		
Sampler(s) Name(s):		Project Manager: Jim McLaughlin		<table border="1"> <tr> <th rowspan="2">Lab Sample #</th> <th rowspan="2">Field ID / Point of Collection</th> <th rowspan="2">MEOH/DI Vial #</th> <th colspan="3">Collection</th> <th rowspan="2">Matrix</th> <th rowspan="2"># of bottles</th> <th colspan="10">Number of preserved bottles</th> <th rowspan="2">LAB USE ONLY</th> </tr> <tr> <th>Date</th> <th>Time</th> <th>Sampled by</th> <th>HCl</th> <th>MEOH</th> <th>HN03</th> <th>H2SO4</th> <th>NONE</th> <th>DI Water</th> <th>MEOH</th> <th>ENCORE</th> </tr> <tr> <td>1</td> <td>BS-G9</td> <td></td> <td>8-17-18</td> <td>1210</td> <td>GQ</td> <td>SO</td> <td>1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td> <td>A24</td> </tr> <tr> <td>2</td> <td>DUP-1 (20180817)</td> <td></td> <td>8-17-18</td> <td>-</td> <td>GQ</td> <td>SO</td> <td>1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td> <td>247</td> </tr> <tr> <td>3</td> <td>BS-H9</td> <td></td> <td>8-17-18</td> <td>1215</td> <td>GQ</td> <td>SD</td> <td>1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td> <td></td> </tr> <tr> <td>4</td> <td>BS-G8A</td> <td></td> <td>8-17-18</td> <td>1205</td> <td>GQ</td> <td>SO</td> <td>1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>(H)</td><td>(H)</td><td>(H)</td><td>(H)</td><td>(H)</td><td>(H)</td><td>(H)</td><td></td> <td>D37</td> </tr> <tr> <td>5</td> <td>FB (20180817)</td> <td></td> <td>8-17-18</td> <td>1240</td> <td>GQ</td> <td>AQ</td> <td>4</td> <td></td><td></td><td>2</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td> <td></td> </tr> </table>												Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection			Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY	Date	Time	Sampled by	HCl	MEOH	HN03	H2SO4	NONE	DI Water	MEOH	ENCORE	1	BS-G9		8-17-18	1210	GQ	SO	1											X	X	X	X	X	X	X		A24	2	DUP-1 (20180817)		8-17-18	-	GQ	SO	1											X	X	X	X	X	X	X		247	3	BS-H9		8-17-18	1215	GQ	SD	1											X	X	X	X	X	X	X			4	BS-G8A		8-17-18	1205	GQ	SO	1											(H)	(H)	(H)	(H)	(H)	(H)	(H)		D37	5	FB (20180817)		8-17-18	1240	GQ	AQ	4			2	2							X	X	X	X	X	X	X		
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection			Matrix	# of bottles	Number of preserved bottles											LAB USE ONLY																																																																																																																																																																	
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5	FB (20180817)		8-17-18	1240	GQ	AQ	4			2	2							X	X	X	X	X	X	X																																																																																																																																																												
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format EQVIS <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting												Comments / Special Instructions (H) = HOLD FOR ANALYSIS INITIAL ASSESSMENT KRA LABEL VERIFICATION																																																																																																																																																																				
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data Sample inventory is verified upon receipt in the Laboratory																																																																																																																																																																																
Relinquished to Sampler: 1		Date Time: 8-17-18		Received By: J. Schan 8/17/18 105		Date Time: 8/17/18		Relinquished By: 173		Date Time: 8/17/18		Received By: [Signature]		Date Time: 8/17/18		Received By: [Signature]																																																																																																																																																																				
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Relinquished by: 5		Date Time:		Received By: 5		Date Time:		Custody Seal # 066164		Intact <input type="checkbox"/>		Preserved where applicable <input type="checkbox"/>		On Ice <input checked="" type="checkbox"/>		Cooler Temp. 38																																																																																																																																																																				

5.2
5



Report of Analysis

Client Sample ID: BS-G9	Date Sampled: 08/17/18
Lab Sample ID: JC72118-1	Date Received: 08/17/18
Matrix: SO - Soil	Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ	0.53	mg/kg	1	08/21/18 12:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	297		mv	1	08/20/18 10:15	RB	ASTM D1498-76M
Solids, Percent	75.3		%	1	08/20/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.05 J		su	1	08/20/18 10:11	RB	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: DUP-1 (20180817)	Date Sampled: 08/17/18
Lab Sample ID: JC72118-2	Date Received: 08/17/18
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ	0.50	mg/kg	1	08/21/18 12:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	326		mv	1	08/20/18 10:37	RB	ASTM D1498-76M
Solids, Percent	79.8		%	1	08/20/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.00 J		su	1	08/20/18 10:15	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H9	Date Sampled: 08/17/18
Lab Sample ID: JC72118-3	Date Received: 08/17/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ	0.46	mg/kg	1	08/21/18 12:17	RI	SW846 3060A/7196A
Redox Potential Vs H2	253		mv	1	08/20/18 10:41	RB	ASTM D1498-76M
Solids, Percent	86.3		%	1	08/20/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.31 J		su	1	08/20/18 10:37	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB (20180817)	Date Sampled: 08/17/18
Lab Sample ID: JC72118-5	Date Received: 08/17/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/17/18 20:50	LS	SW846 7196A
Redox Potential Vs H2	365		mv	1	08/20/18 14:40	RB	ASTM D1498-76
pH ^a	5.36		su	1	08/17/18 18:15	GE	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G9		Date Sampled: 08/17/18
Lab Sample ID: JC72118-1A		Date Received: 08/17/18
Matrix: SO - Soil		Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.4	1.4	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	44.4	5.4	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.2	6.8	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45121

(2) Prep QC Batch: MP8714

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G9		Date Sampled: 08/17/18
Lab Sample ID: JC72118-1A		Date Received: 08/17/18
Matrix: SO - Soil		Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.4	1.9	mg/kg	1	08/21/18 12:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: DUP-1 (20180817) Lab Sample ID: JC72118-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/17/18 Date Received: 08/17/18 Percent Solids: 79.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.3	1.3	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	43.4	5.2	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.9	6.5	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45121

(2) Prep QC Batch: MP8714

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-1 (20180817)	Date Sampled: 08/17/18
Lab Sample ID: JC72118-2A	Date Received: 08/17/18
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.3	1.8	mg/kg	1	08/21/18 12:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H9		Date Sampled: 08/17/18
Lab Sample ID: JC72118-3A		Date Received: 08/17/18
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.0	1.2	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.9	4.6	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	5.8	mg/kg	1	08/18/18	08/20/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45121

(2) Prep QC Batch: MP8714

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H9	Date Sampled: 08/17/18
Lab Sample ID: JC72118-3A	Date Received: 08/17/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.6	1.7	mg/kg	1	08/21/18 12:17	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB (20180817) Lab Sample ID: JC72118-5A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/17/18 Date Received: 08/17/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/19/18	08/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/19/18	08/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/19/18	08/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/19/18	08/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/19/18	08/20/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45122

(2) Prep QC Batch: MP8717

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB (20180817)		Date Sampled: 08/17/18
Lab Sample ID: JC72118-5A		Date Received: 08/17/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/20/18 20:10	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H7C	Date Sampled: 08/21/18
Lab Sample ID: JC72252-1	Date Received: 08/21/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	22.9	0.46	mg/kg	1	08/22/18 16:16	RI	SW846 3060A/7196A
Redox Potential Vs H2	359		mv	1	08/22/18 14:02	AC	ASTM D1498-76M
Solids, Percent	86.4		%	1	08/22/18 09:15	RC	SM2540 G 18TH ED MOD
pH	6.78		su	1	08/22/18 11:15	AC	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180821) Lab Sample ID: JC72252-2 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/21/18 Date Received: 08/21/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/21/18 22:15	LS	SW846 7196A
Redox Potential Vs H2	551		mv	1	08/22/18 11:02	AC	ASTM D1498-76
pH ^a	5.58		su	1	08/21/18 16:24	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H7C		Date Sampled: 08/21/18
Lab Sample ID: JC72252-1A		Date Received: 08/21/18
Matrix: SO - Soil		Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	32.0	1.1	mg/kg	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	5.6	mg/kg	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45136

(2) Prep QC Batch: MP8764

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H7C		Date Sampled: 08/21/18
Lab Sample ID: JC72252-1A		Date Received: 08/21/18
Matrix: SO - Soil		Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.1	1.6	mg/kg	1	08/23/18 00:13	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180821) Lab Sample ID: JC72252-2A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/21/18 Date Received: 08/21/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/22/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45136

(2) Prep QC Batch: MP8763

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB (20180821)	Date Sampled: 08/21/18
Lab Sample ID: JC72252-2A	Date Received: 08/21/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/23/18 06:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C10	Date Sampled: 08/22/18
Lab Sample ID: JC72335-1	Date Received: 08/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	08/24/18 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	247		mv	1	08/23/18 12:40	AC	ASTM D1498-76M
Solids, Percent	80.1		%	1	08/23/18 14:00	LV	SM2540 G 18TH ED MOD
pH	6.31		su	1	08/23/18 11:06	AC	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D10		Date Sampled: 08/22/18
Lab Sample ID: JC72335-2		Date Received: 08/22/18
Matrix: SO - Soil		Percent Solids: 47.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93 J-	0.84	mg/kg	1	08/24/18 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	268		mv	1	08/23/18 12:45	AC	ASTM D1498-76M
Solids, Percent	47.6		%	1	08/23/18 14:00	LV	SM2540 G 18TH ED MOD
pH	6.32		su	1	08/23/18 11:15	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180822) Lab Sample ID: JC72335-3 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/22/18 Date Received: 08/22/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/22/18 19:48	LS	SW846 7196A
Redox Potential Vs H2	530		mv	1	08/23/18 10:37	AC	ASTM D1498-76
pH ^a	5.91		su	1	08/22/18 16:29	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C10		Date Sampled: 08/22/18
Lab Sample ID: JC72335-1A		Date Received: 08/22/18
Matrix: SO - Soil		Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.0	1.2	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.2	5.0	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.8	6.2	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45143

(2) Prep QC Batch: MP8788

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C10	Date Sampled: 08/22/18
Lab Sample ID: JC72335-1A	Date Received: 08/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.0	1.7	mg/kg	1	08/24/18 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D10		Date Sampled: 08/22/18
Lab Sample ID: JC72335-2A		Date Received: 08/22/18
Matrix: SO - Soil		Percent Solids: 47.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 4.0	4.0	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	78.0	2.0	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.3	8.1	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 2.0	2.0	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	10	mg/kg	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45143

(2) Prep QC Batch: MP8788

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D10	Date Sampled: 08/22/18
Lab Sample ID: JC72335-2A	Date Received: 08/22/18
Matrix: SO - Soil	Percent Solids: 47.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	77.1	2.8	mg/kg	1	08/24/18 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180822)		Date Sampled: 08/22/18
Lab Sample ID: JC72335-3A		Date Received: 08/22/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/23/18	08/23/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45142

(2) Prep QC Batch: MP8787

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180822)		Date Sampled: 08/22/18
Lab Sample ID: JC72335-3A		Date Received: 08/22/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/23/18 17:00	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C10	Date Sampled: 08/22/18
Lab Sample ID: JC72335-1R	Date Received: 08/22/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	08/28/18 11:54	RI	SW846 3060A/7196A
Iron, Ferrous	1.9 J	0.20	%	1	08/28/18 11:30	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	08/28/18	ST	SM4500S2- A-11
Total Organic Carbon	20200	120	mg/kg	1	08/27/18 18:05	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D10	Date Sampled: 08/22/18
Lab Sample ID: JC72335-2R	Date Received: 08/22/18
Matrix: SO - Soil	Percent Solids: 47.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.84	0.84	mg/kg	1	08/28/18 11:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
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PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC72443, JC72521, and JC72616

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30556R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC72443, JC72521, and JC72616 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC72443	FB (20180823)	JC72443-1	Water	8/23/2018		X	X	X
	BS-D9	JC72443-2	Soil	8/23/2018		X	X	X
	BS-E10	JC72443-3	Soil	8/23/2018		X	X	X
	BS-F10	JC72443-4	Soil	8/23/2018		X	X	X
	BS-G10	JC72443-5	Soil	8/23/2018		X	X	X
JC72521	FB (20180824)	JC72521-1	Water	8/24/2018		X		X
	BS-H7D	JC72521-2	Soil	8/24/2018		X		X
JC72616	FB (20180827)	JC72616-1	Water	8/27/2018		X	X	X
	BS-C9	JC72616-2	Soil	8/27/2018		X	X	X
	BS-H10	JC72616-3	Soil	8/27/2018		X	X	X
	BS-I10	JC72616-4	Soil	8/27/2018		X	X	X
	BS-C11	JC72616-5	Soil	8/27/2018		X	X	X
	BS-D11	JC72616-6	Soil	8/27/2018		X	X	X
	BS-E11	JC72616-7	Soil	8/27/2018		X	X	X
	BS-F11	JC72616-8	Soil	8/27/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC72334 and JC72616: Miscellaneous parameters for samples BS-D9 and BS-C9 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDG #JC72443: The MS/MSD analysis was not performed using a sample from this SDG.

SDG #JC72616: The MS/MSD analysis performed on sample location BS-H10 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H10	Antimony	72.8%	AC (75.6%)

Notes:

AC Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC72443: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDG #JC72616: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-H10. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDG #JC72443: The serial dilution analysis was not performed using a sample from this SDG.

SDG #JC72616: The serial dilution performed on sample location BS-H10 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC72521: The MS analysis performed on sample location BS-H7D in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC72443: The MS analysis performed on sample location BS-D9 in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

SDGs #JC72443 and JC72616: The MS analysis performed on sample locations BS-D9 and BS-C9 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-D9	Hexavalent Chromium, Soluble	57.3%	70.7%
BS-C9	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	< 50%	51.1%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC72443: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC72616: The reanalysis of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

DATA REVIEW REPORT

The PDS analysis performed on sample locations BS-D9, BS-H7D, and BS-C9 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-D9, BS-H7D, and BS-C9 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-D9 BS-C9	ASTM D3872-86	Analysis: 5 days	< 24 hours from collection
BS-D9 BS-E10 BS-F10 BS-G10	SW846 9045D	Analysis: 2 days	< 24 hours of receipt at laboratory
BS-H7D		Analysis: 4 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

DATA REVIEW REPORT

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:



DATE: September 14, 2018

PEER REVIEW: Dennis Capria

DATE: October 3, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB (20180823)	Date Sampled: 08/23/18
Lab Sample ID: JC72443-1	Date Received: 08/23/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/23/18 21:55	LS	SW846 7196A
Redox Potential Vs H2	450		mv	1	08/25/18 09:42	AC	ASTM D1498-76
pH ^a	6.03		su	1	08/23/18 17:45	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

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Report of Analysis

Client Sample ID: BS-D9	Date Sampled: 08/23/18
Lab Sample ID: JC72443-2	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	08/27/18 16:15	RI	SW846 3060A/7196A
Redox Potential Vs H2	208		mv	1	08/25/18 16:10	AC	ASTM D1498-76M
Solids, Percent	79		%	1	08/24/18 10:40	RC	SM2540 G 18TH ED MOD
pH	7.04 J		su	1	08/25/18 15:40	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-3	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	08/27/18 16:20	RI	SW846 3060A/7196A
Redox Potential Vs H2	233		mv	1	08/25/18 16:15	AC	ASTM D1498-76M
Solids, Percent	83.7		%	1	08/24/18 10:40	RC	SM2540 G 18TH ED MOD
pH	7.08 J		su	1	08/25/18 15:41	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-4	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	08/27/18 16:20	RI	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	08/25/18 16:23	AC	ASTM D1498-76M
Solids, Percent	82.5		%	1	08/24/18 10:40	RC	SM2540 G 18TH ED MOD
pH	6.68 J		su	1	08/25/18 15:45	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-5	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88 J-	0.48	mg/kg	1	08/27/18 16:20	RI	SW846 3060A/7196A
Redox Potential Vs H2	205		mv	1	08/25/18 16:30	AC	ASTM D1498-76M
Solids, Percent	84.1		%	1	08/24/18 10:40	RC	SM2540 G 18TH ED MOD
pH	7.49 J		su	1	08/25/18 15:49	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB (20180823) Lab Sample ID: JC72443-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/18 Date Received: 08/23/18 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45150

(2) Prep QC Batch: MP8798

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180823) Lab Sample ID: JC72443-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/18 Date Received: 08/23/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/24/18 18:19	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D9		Date Sampled: 08/23/18
Lab Sample ID: JC72443-2A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	15.5	1.2	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³
Nickel	11.5	5.0	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	22.6	6.2	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA45151
- (2) Instrument QC Batch: MA45154
- (3) Prep QC Batch: MP8802

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D9		Date Sampled: 08/23/18
Lab Sample ID: JC72443-2A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.7	mg/kg	1	08/27/18 16:15	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-3A	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	24.4	1.2	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³
Nickel	28.4	4.8	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	27.7	6.0	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA45151

(2) Instrument QC Batch: MA45154

(3) Prep QC Batch: MP8802

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E10		Date Sampled: 08/23/18
Lab Sample ID: JC72443-3A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.0	1.7	mg/kg	1	08/27/18 16:20	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F10		Date Sampled: 08/23/18
Lab Sample ID: JC72443-4A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	30.2	1.2	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³
Nickel	74.7	4.8	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	28.0	6.0	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA45151
- (2) Instrument QC Batch: MA45154
- (3) Prep QC Batch: MP8802

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F10		Date Sampled: 08/23/18
Lab Sample ID: JC72443-4A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.2	1.7	mg/kg	1	08/27/18 16:20	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G10		Date Sampled: 08/23/18
Lab Sample ID: JC72443-5A		Date Received: 08/23/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	15.8	1.2	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³
Nickel	13.9	4.7	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	08/24/18	08/24/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	22.7	5.8	mg/kg	1	08/24/18	08/26/18 GT	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA45151
- (2) Instrument QC Batch: MA45154
- (3) Prep QC Batch: MP8802

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-G10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-5A	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.9	1.7	mg/kg	1	08/27/18 16:20	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D9	Date Sampled: 08/23/18
Lab Sample ID: JC72443-2R	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.51	mg/kg	1	08/29/18 11:47	RI	SW846 3060A/7196A
Iron, Ferrous	1.1 J	0.20	%	1	08/28/18 11:30	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	08/28/18	ST	SM4500S2- A-11
Total Organic Carbon	6370	130	mg/kg	1	08/29/18 20:46	CD	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-3R	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	08/29/18 11:51	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-4R	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	08/29/18 11:51	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G10	Date Sampled: 08/23/18
Lab Sample ID: JC72443-5R	Date Received: 08/23/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.48	mg/kg	1	08/29/18 11:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20180824)		Date Sampled: 08/24/18
Lab Sample ID: JC72521-1		Date Received: 08/24/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/24/18 21:40	LS	SW846 7196A
Redox Potential Vs H2	418		mv	1	08/28/18 10:49	AC	ASTM D1498-76
pH ^a	7.39		su	1	08/24/18 16:47	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H7D	Date Sampled: 08/24/18
Lab Sample ID: JC72521-2	Date Received: 08/24/18
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.6	0.45	mg/kg	1	08/28/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	392		mv	1	08/28/18 12:11	AC	ASTM D1498-76M
Solids, Percent	88.6		%	1	08/27/18 10:00	RC	SM2540 G 18TH ED MOD
pH	6.89 J		su	1	08/28/18 12:08	AC	SW846 9045D

RL = Reporting Limit

4.2
4



50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC72616

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes
Company Name: Arcaadu		Project Name: PPG Jersey City Site 107										Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane Suite 200		Street: 18 Chapel Ave																	
City: Newtown PA 18440		City: Jersey City NJ																	
Project Contact: Krista Mastrocchia		Project #: NPO00770.0001.02008																	
Phone #: 610.755.7080		Client Purchase Order #																	
Sample Name(s): Chrisna Cifalli		Project Manager: Jim McLanahan																	
Lab Sample #		Field ID / Point of Collection																	
MEOH/DI Vial #		Date																	
Time		Sampled by																	
Matrix		# of bottles																	
HCl		HNO ₃																	
H ₂ SO ₄		H ₂ CO ₃																	
DI Water		NONE																	
MEOH		ENCORE																	
LAB USE ONLY																			
Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions							
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Equis <input type="checkbox"/> Other							
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory is verified upon receipt in the Laboratory							
Relinquished by Sampler: [Signature]		Date Time: 8/27/18 14:00		Received By: Robert Chambers		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]			
Relinquished by Sampler: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]			
Relinquished by: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]		Date Time: 8/27/18		Received By: [Signature]			
Custody Seal # 05924		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact										<input type="checkbox"/> Preserved where applicable <input checked="" type="checkbox"/> On Ice <input checked="" type="checkbox"/> Cooler Temp 3.2°C							

5.2
5



Report of Analysis

Client Sample ID: FB(20180827) Lab Sample ID: JC72616-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/27/18 Date Received: 08/27/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/27/18 21:55	LS	SW846 7196A
Redox Potential Vs H2	459		mv	1	08/28/18 10:51	AC	ASTM D1498-76
pH ^a	5.99		su	1	08/27/18 17:08	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C9	Date Sampled: 08/27/18
Lab Sample ID: JC72616-2	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	08/29/18 10:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	187		mv	1	08/28/18 12:23	AC	ASTM D1498-76M
Solids, Percent	78.3		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	7.01		su	1	08/28/18 12:11	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H10	Date Sampled: 08/27/18
Lab Sample ID: JC72616-3	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67	0.45	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	08/28/18 12:25	AC	ASTM D1498-76M
Solids, Percent	89.7		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	6.72		su	1	08/28/18 12:14	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I10	Date Sampled: 08/27/18
Lab Sample ID: JC72616-4	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	27.7	0.45	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	490		mv	1	08/28/18 12:28	AC	ASTM D1498-76M
Solids, Percent	88.3		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	5.99		su	1	08/28/18 12:22	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-5	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	349		mv	1	08/28/18 12:41	AC	ASTM D1498-76M
Solids, Percent	72.1		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	7.84		su	1	08/28/18 12:26	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-6	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	282		mv	1	08/28/18 12:44	AC	ASTM D1498-76M
Solids, Percent	87.8		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	7.14		su	1	08/28/18 12:45	AC	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-E11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-7	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.46	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	291		mv	1	08/28/18 13:07	AC	ASTM D1498-76M
Solids, Percent	87.2		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	7.49		su	1	08/28/18 12:58	AC	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-8	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.45	mg/kg	1	08/29/18 10:24	RI	SW846 3060A/7196A
Redox Potential Vs H2	306		mv	1	08/28/18 13:09	AC	ASTM D1498-76M
Solids, Percent	88.1		%	1	08/28/18 11:10	RC	SM2540 G 18TH ED MOD
pH	7.53		su	1	08/28/18 13:07	AC	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: FB(20180827)		Date Sampled: 08/27/18
Lab Sample ID: JC72616-1A		Date Received: 08/27/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/28/18	08/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/28/18	08/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/28/18	08/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/28/18	08/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/28/18	08/29/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45171

(2) Prep QC Batch: MP8846

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180827)		Date Sampled: 08/27/18
Lab Sample ID: JC72616-1A		Date Received: 08/27/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/29/18 04:40	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C9		Date Sampled: 08/27/18
Lab Sample ID: JC72616-2A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.4	1.3	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.3	5.2	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.6	6.5	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C9		Date Sampled: 08/27/18
Lab Sample ID: JC72616-2A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.4	1.8	mg/kg	1	08/29/18 10:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H10		Date Sampled: 08/27/18
Lab Sample ID: JC72616-3A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.9 J-	2.3	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.5	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.9	4.6	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.5	5.8	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H10		Date Sampled: 08/27/18
Lab Sample ID: JC72616-3A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.8 15.4	1.7	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I10		Date Sampled: 08/27/18
Lab Sample ID: JC72616-4A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	69.3	1.1	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.4	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.2	5.5	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I10	Date Sampled: 08/27/18
Lab Sample ID: JC72616-4A	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	41.6 45.9 J-	1.6	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-5A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	249	1.4	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	28.9	5.4	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	39.5	6.8	mg/kg	1	08/28/18	08/28/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-C11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-5A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	249	2.0	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-6A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.7 J-	2.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.0	1.1	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	4.4	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	5.5	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-D11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-6A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.6	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E11 Lab Sample ID: JC72616-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/27/18 Date Received: 08/27/18 Percent Solids: 87.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	19.5 J-	2.3	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.4	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.3	4.7	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	13.9	5.9	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-E11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-7A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.3 14.9	1.7	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-8A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	7.9 J-	2.4	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.0	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.4	4.7	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	12.8	5.9	mg/kg	1	08/28/18	08/28/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45168

(2) Prep QC Batch: MP8852

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-8A		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.8
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.4 11.0	1.7	mg/kg	1	08/29/18 10:24	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C9		Date Sampled: 08/27/18
Lab Sample ID: JC72616-2R		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	08/31/18 15:51	RI	SW846 3060A/7196A
Iron, Ferrous	1.3 J	0.20	%	1	09/01/18 12:45	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	09/01/18 13:00	MP	SM4500S2- A-11
Total Organic Carbon	1230	130	mg/kg	1	09/04/18 14:05	CD	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H10	Date Sampled: 08/27/18
Lab Sample ID: JC72616-3R	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.45	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I10	Date Sampled: 08/27/18
Lab Sample ID: JC72616-4R	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	23.4 J-	0.45	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-5R	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D11		Date Sampled: 08/27/18
Lab Sample ID: JC72616-6R		Date Received: 08/27/18
Matrix: SO - Soil		Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-7R	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.46	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F11	Date Sampled: 08/27/18
Lab Sample ID: JC72616-8R	Date Received: 08/27/18
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98 J-	0.45	mg/kg	1	08/31/18 15:55	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC72909, JC73063, and JC73132

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #30631R

Review Level: Tier III

Project: NP000770.0001.00008

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC72909, JC73063, and JC73132 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC72909	FB(20180831)	JC72909-1	Water	8/31/2018		X	X	X
	BS-H11	JC72909-2	Soil	8/31/2018		X	X	X
	BS-G10A	JC72909-3	Soil	8/31/2018		X	X	X
	BS-G11	JC72909-4	Soil	8/31/2018		X	X	X
	CS-F10	JC72909-5	Soil	8/31/2018		X		X
JC73063	BS-C10A	JC73063-1	Soil	9/4/2018		X	X	X
	BS-D12	JC73063-2	Soil	9/4/2018		X	X	X
	DUP-10(20180904)	JC73063-3	Soil	9/4/2018	BS-D12	X	X	X
	BS-E12	JC73063-4	Soil	9/4/2018		X	X	X
	FB(20180904)	JC73063-5	Water	9/4/2018		X	X	X
JC73132	BS-C8B	JC73132-1	Soil	9/5/2018		X	X	X
	ID007	JC73132-2	Soil	9/5/2018		X	X	X
	BS-I10A	JC73132-3	Soil	9/5/2018		X		X
	FB(20180905)	JC73132-4	Water	9/5/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC73063 and JC73132: Miscellaneous parameters for samples BS-C10A and BS-I10A also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC73063 and JC73132: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC72909: The MS/MSD analysis performed on sample location BS-H10 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H11	Antimony	66.7%	65.9%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC73063 and JC73132: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC72909: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-H11. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12 / DUP-10(20180904)	Chromium	34.5	30.8	11.3%
	Nickel	23.0	23.2	0.9%
	Vanadium	30.0	31.0	3.3%
	Trivalent Chromium	34.5	30.8	11.3%

The differences in the results between the parent sample BS-D12 and field duplicate sample DUP-10(20180904) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC73063 and JC73132: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC72909: The serial dilution performed on sample location BS-H11 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC72909: The MS analysis performed on sample location BS-H11 in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

SDG #JC73132: The MS analysis performed on sample location BS-C8B in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC72909, JC73063, and JC73132: The MS analysis performed on sample location BS-H11, BS-C10A, and BS-I10A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H11	Hexavalent Chromium, Soluble	65.1%	Not reanalyzed
BS-C10A	Hexavalent Chromium, Insoluble	70.4%	57.6%
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-I10A	Hexavalent Chromium, Insoluble	< 50%	66.1%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC72909 and JC73063: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC73132: The reanalysis of the field samples are usable with appropriate qualification. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC72909 and JC73132: The PDS analysis performed on sample locations BS-H11 and BS-C8B exhibited recoveries within the control limits.

SDGs #JC73063 and JC73132: Spike recoveries were outside of the control limits as presented in the table below.

Sample Location	Analyte	Initial PDS Recovery	Reanalysis PDS Recovery
BS-C10A	Hexavalent Chromium	< 85%	< 85%
BS-I10A	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC72909, JC73063, and JC73132: The laboratory duplicate analysis performed on sample locations BS-H11, BS-C10A, BS-C8B, and BS-I10A exhibited results above the control limit as presented in the following table.

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Sample Location	Analytes	Laboratory RPD
BS-H11	Hexavalent Chromium	70.8%
BS-C10A	Hexavalent Chromium	> 1-times RL
BS-C8B	Hexavalent Chromium	25.9%
BS-I10A (reanalysis)	Hexavalent Chromium	> 1-times RL

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and laboratory sample concentration > 4 times RL	20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result ≤ 4 times the RL and difference between samples > RL	1 times RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12 / DUP-10(20180904)	Hexavalent Chromium	0.43 U	0.44 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample BS-D12 and field duplicate sample DUP-10(20180904).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-C10A BS-I10A	ASTM D3872-86	Analysis: 6 days	< 24 hours from collection
BS-I10A	SW846 9045D	Analysis: 2 days	< 24 hours of receipt at laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

DATA REVIEW REPORT

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12 / DUP-10(20180904)	Redox Potential	270	328	19.4%
	pH	7.38	7.58	2.7%

The differences in the results between the parent sample BS-D12 and field duplicate sample DUP-10(20180904) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: November 30, 2018

PEER REVIEW: Dennis Capria

DATE: December 3, 2018

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





WFB

CHAIN OF CUSTODY

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E

FED-EX Tracking #
SGS Order #

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, Comments / Special Instructions, Chain of Custody table, Retrievability table.

A20
G18
C63

5.2
5



Report of Analysis

Client Sample ID: FB(20180831)	Date Sampled: 08/31/18
Lab Sample ID: JC72909-1	Date Received: 08/31/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	512		mv	1	09/01/18 10:30	AC	ASTM D1498-76
pH ^a	5.25		su	1	08/31/18 16:04	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H11	Date Sampled: 08/31/18
Lab Sample ID: JC72909-2	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.5 J	0.46	mg/kg	1	09/05/18 15:05	RP	SW846 3060A/7196A
Redox Potential Vs H2	284		mv	1	09/01/18 15:59	AC	ASTM D1498-76M
Solids, Percent	87.2		%	1	09/01/18 10:35	LV	SM2540 G 18TH ED MOD
pH	7.31		su	1	09/01/18 15:25	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G10A	Date Sampled: 08/31/18
Lab Sample ID: JC72909-3	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J	0.46	mg/kg	1	09/05/18 15:10	RP	SW846 3060A/7196A
Redox Potential Vs H2	169		mv	1	09/01/18 16:24	AC	ASTM D1498-76M
Solids, Percent	86.9		%	1	09/01/18 11:30	LV	SM2540 G 18TH ED MOD
pH	7.36		su	1	09/01/18 15:29	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 08/31/18
Lab Sample ID: JC72909-4	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71 J	0.47	mg/kg	1	09/05/18 15:10	RP	SW846 3060A/7196A
Redox Potential Vs H2	163		mv	1	09/01/18 16:30	AC	ASTM D1498-76M
Solids, Percent	84.6		%	1	09/01/18 11:30	LV	SM2540 G 18TH ED MOD
pH	7.88		su	1	09/01/18 15:37	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-F10	Date Sampled: 08/31/18
Lab Sample ID: JC72909-5	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 98.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J	0.40	mg/kg	1	09/05/18 15:10	RP	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	09/01/18 16:39	AC	ASTM D1498-76M
Solids, Percent	98.9		%	1	09/01/18 11:30	LV	SM2540 G 18TH ED MOD
pH	7.21		su	1	09/01/18 15:46	AC	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180831)		Date Sampled: 08/31/18
Lab Sample ID: JC72909-1A		Date Received: 08/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/04/18	09/04/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/04/18	09/04/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/04/18	09/04/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/04/18	09/04/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/04/18	09/04/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45197

(2) Prep QC Batch: MP8923

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180831)		Date Sampled: 08/31/18
Lab Sample ID: JC72909-1A		Date Received: 08/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/31/18	JOO	SW846 7196A
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/04/18 19:04	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H11		Date Sampled: 08/31/18
Lab Sample ID: JC72909-2A		Date Received: 08/31/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	38.7	1.1	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	11.4	4.6	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	20.2	5.7	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45194

(2) Prep QC Batch: MP8920

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H11		Date Sampled: 08/31/18
Lab Sample ID: JC72909-2A		Date Received: 08/31/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.2 J	1.6	mg/kg	1	09/05/18 15:05	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G10A	Date Sampled: 08/31/18
Lab Sample ID: JC72909-3A	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/01/18	09/02/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	13.7	1.2	mg/kg	1	09/01/18	09/02/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	12.5	4.6	mg/kg	1	09/01/18	09/02/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/01/18	09/02/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.3	5.8	mg/kg	1	09/01/18	09/02/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45194

(2) Prep QC Batch: MP8920

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G10A		Date Sampled: 08/31/18
Lab Sample ID: JC72909-3A		Date Received: 08/31/18
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.6	1.7	mg/kg	1	09/05/18 15:10	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G11		Date Sampled: 08/31/18
Lab Sample ID: JC72909-4A		Date Received: 08/31/18
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	38.9 J-	2.4	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	18.8	1.2	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	22.9	4.8	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	8.5	6.0	mg/kg	1	09/01/18	09/02/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45194

(2) Prep QC Batch: MP8920

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 08/31/18
Lab Sample ID: JC72909-4A	Date Received: 08/31/18
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.1	1.7	mg/kg	1	09/05/18 15:10	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C10A	Date Sampled: 09/04/18
Lab Sample ID: JC73063-1	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.48	mg/kg	1	09/05/18 16:33	RP	SW846 3060A/7196A
Redox Potential Vs H2	311		mv	1	09/05/18 13:24	AC	ASTM D1498-76M
Solids, Percent	83.4		%	1	09/05/18 08:46	RC	SM2540 G 18TH ED MOD
pH	6.08		su	1	09/05/18 13:10	AC	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D12	Date Sampled: 09/04/18
Lab Sample ID: JC73063-2	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ	0.43	mg/kg	1	09/05/18 16:43	RP	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	09/05/18 14:13	AC	ASTM D1498-76M
Solids, Percent	93.2		%	1	09/05/18 08:46	RC	SM2540 G 18TH ED MOD
pH	7.38		su	1	09/05/18 13:16	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-10(20180904)	Date Sampled: 09/04/18
Lab Sample ID: JC73063-3	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44 UJ	0.44	mg/kg	1	09/05/18 16:43	RP	SW846 3060A/7196A
Redox Potential Vs H2	328		mv	1	09/05/18 14:22	AC	ASTM D1498-76M
Solids, Percent	89.9		%	1	09/05/18 08:46	RC	SM2540 G 18TH ED MOD
pH	7.58		su	1	09/05/18 13:19	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E12	Date Sampled: 09/04/18
Lab Sample ID: JC73063-4	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J	0.42	mg/kg	1	09/05/18 16:43	RP	SW846 3060A/7196A
Redox Potential Vs H2	215		mv	1	09/05/18 14:36	AC	ASTM D1498-76M
Solids, Percent	95.3		%	1	09/05/18 08:46	RC	SM2540 G 18TH ED MOD
pH	8.80		su	1	09/05/18 14:23	AC	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20180904) Lab Sample ID: JC73063-5 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/18 Date Received: 09/04/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/04/18 23:35	LS	SW846 7196A
Redox Potential Vs H2	452		mv	1	09/05/18 10:57	AC	ASTM D1498-76
pH ^a	5.67		su	1	09/04/18 16:21	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C10A	Date Sampled: 09/04/18
Lab Sample ID: JC73063-1R	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.80	0.48	mg/kg	1	09/10/18 16:32	RI	SW846 3060A/7196A
Iron, Ferrous	1.5 J	0.20	%	1	09/10/18 13:00	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	09/10/18 13:00	ST	SM4500S2- A-11
Total Organic Carbon	21300	120	mg/kg	1	09/11/18 11:46	CD	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D12	Date Sampled: 09/04/18
Lab Sample ID: JC73063-2R	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	09/10/18 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-10(20180904)	Date Sampled: 09/04/18
Lab Sample ID: JC73063-3R	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.44	mg/kg	1	09/10/18 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E12	Date Sampled: 09/04/18
Lab Sample ID: JC73063-4R	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60	0.42	mg/kg	1	09/10/18 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C10A	Date Sampled: 09/04/18
Lab Sample ID: JC73063-1A	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.3	1.2	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	4.7	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.1	5.9	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45206

(2) Prep QC Batch: MP8945

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C10A		Date Sampled: 09/04/18
Lab Sample ID: JC73063-1A		Date Received: 09/04/18
Matrix: SO - Soil		Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.0 J	1.7	mg/kg	1	09/05/18 18:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D12		Date Sampled: 09/04/18
Lab Sample ID: JC73063-2A		Date Received: 09/04/18
Matrix: SO - Soil		Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	34.5	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.0	4.3	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	30.0	5.4	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45206

(2) Prep QC Batch: MP8945

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D12		Date Sampled: 09/04/18
Lab Sample ID: JC73063-2A		Date Received: 09/04/18
Matrix: SO - Soil		Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.5	1.5	mg/kg	1	09/05/18 18:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-10(20180904) Lab Sample ID: JC73063-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/18 Date Received: 09/04/18 Percent Solids: 89.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	30.8	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.2	4.5	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.0	5.7	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45206

(2) Prep QC Batch: MP8945

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-10(20180904)		Date Sampled: 09/04/18
Lab Sample ID: JC73063-3A		Date Received: 09/04/18
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.8	1.5	mg/kg	1	09/05/18 18:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E12		Date Sampled: 09/04/18
Lab Sample ID: JC73063-4A		Date Received: 09/04/18
Matrix: SO - Soil		Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.2	2.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.4	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.8	4.3	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.1	5.4	mg/kg	1	09/05/18	09/05/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45206

(2) Prep QC Batch: MP8945

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E12	Date Sampled: 09/04/18
Lab Sample ID: JC73063-4A	Date Received: 09/04/18
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.9 J	1.5	mg/kg	1	09/05/18 18:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20180904)		Date Sampled: 09/04/18
Lab Sample ID: JC73063-5A		Date Received: 09/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/05/18	09/05/18	MET SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/05/18	09/05/18	MET SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/05/18	09/05/18	MET SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/05/18	09/05/18	MET SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/05/18	09/05/18	MET SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45208

(2) Prep QC Batch: MP8946

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20180904)	Date Sampled: 09/04/18
Lab Sample ID: JC73063-5A	Date Received: 09/04/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/05/18 15:47	MET	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



50
PM

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **LS-08348-16**
SGS Job # **JC73132**

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes		
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)				Total chromium Hexavalent chromium Trivalent chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue		Billing Information (if different from Report to) City Jersey City NJ														
City Newtown, PA		State PA		Zip 18440														
Project Contact Krista Mastrocels		Project # NP000770.0001		Street Address														
Phone # 610-755-7080		Fax #		Client Purchase Order #		City		State		Zip		LAB USE ONLY L62 A12 G77						
Sample Name(s) Gina Quinones		Phone #		Project Manager Jim McLaughlin, Jr.		Attention:												
Lab #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	HNO3	H2SO4	HNO2		HNO3	H2O2	DI Water	HClO4	HNO3	H2O2
1	BS-C8R		9-5-18	1110	GQ	SO	1											
2	ID007		9-5-18	1135	GQ	SO	1											
3	BS-I10A		9-5-18	1140	GQ	SO	1											
4	FB(20180905)		9-5-18	1315	GQ	SD	4	2	2									

Turnaround Time (Business days)		Data Deliverable Information				Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Egis <input type="checkbox"/> Other _____	

Emergency & Rush TIA data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory	
Relinquished by Sampler: Mr. [Signature]	Date Time: 9-5-18 1400	Received By: Robert Chambers	Date Time: 9-5-18 1537	Relinquished By: Robert Chambers	Date Time: 9-5-18	Received By: [Signature]	
Relinquished by Sampler:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	
Relinquished by:	Date Time:	Received By:	Date Time:	Custody Seal # 30164	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Preserved where applicable <input type="checkbox"/> On Ice <input checked="" type="checkbox"/> TP 3.3 °C	

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.



5.2
5

Report of Analysis

Client Sample ID: BS-C8B	Date Sampled: 09/05/18
Lab Sample ID: JC73132-1	Date Received: 09/05/18
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.8 J	0.47	mg/kg	1	09/07/18 15:35	RI	SW846 3060A/7196A
Redox Potential Vs H2	330		mv	1	09/06/18 11:17	AC	ASTM D1498-76M
Solids, Percent	85.8		%	1	09/06/18 09:46	RC	SM2540 G 18TH ED MOD
pH	7.61		su	1	09/06/18 11:01	AC	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ID007	Date Sampled: 09/05/18
Lab Sample ID: JC73132-2	Date Received: 09/05/18
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J	0.43	mg/kg	1	09/07/18 15:37	RI	SW846 3060A/7196A
Redox Potential Vs H2	223		mv	1	09/06/18 11:28	AC	ASTM D1498-76M
Solids, Percent	92.1		%	1	09/06/18 09:46	RC	SM2540 G 18TH ED MOD
pH	8.70		su	1	09/06/18 11:07	AC	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I10A	Date Sampled: 09/05/18
Lab Sample ID: JC73132-3	Date Received: 09/05/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	09/07/18 17:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	252		mv	1	09/07/18 11:51	AC	ASTM D1498-76M
Solids, Percent	82.2		%	1	09/06/18 14:25	LV	SM2540 G 18TH ED MOD
pH	6.24 J		su	1	09/07/18 10:59	AC	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180905)	Date Sampled: 09/05/18
Lab Sample ID: JC73132-4	Date Received: 09/05/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/05/18 19:20	LS	SW846 7196A
Redox Potential Vs H2	511		mv	1	09/06/18 10:28	AC	ASTM D1498-76
pH ^a	4.27		su	1	09/06/18 15:19	AC	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I10A Lab Sample ID: JC73132-3R Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/18 Date Received: 09/05/18 Percent Solids: 82.2
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J	0.49	mg/kg	1	09/12/18 15:09	RI	SW846 3060A/7196A
Iron, Ferrous	1.2 J	0.20	%	1	09/11/18 10:21	MP	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	09/11/18	MP	SM4500S2- A-11
Total Organic Carbon ^a	55700	120	mg/kg	1	09/11/18 12:08	CD	LLOYD KAHN 1988 MOD

(a) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C8B		Date Sampled: 09/05/18
Lab Sample ID: JC73132-1A		Date Received: 09/05/18
Matrix: SO - Soil		Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Chromium	32.8	1.2	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Nickel	10.8	4.8	mg/kg	1	09/06/18	09/07/18 MET	SW846 6010D ²	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Vanadium	27.6	6.0	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA45217
- (2) Instrument QC Batch: MA45220
- (3) Prep QC Batch: MP8968

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C8B		Date Sampled: 09/05/18
Lab Sample ID: JC73132-1A		Date Received: 09/05/18
Matrix: SO - Soil		Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.0 J	1.7	mg/kg	1	09/07/18 15:35	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ID007		Date Sampled: 09/05/18
Lab Sample ID: JC73132-2A		Date Received: 09/05/18
Matrix: SO - Soil		Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	198	2.2	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Chromium	129	1.1	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Nickel	65.7	4.4	mg/kg	1	09/06/18	09/07/18 MET	SW846 6010D ²	SW846 3050B ³
Thallium	< 1.1	1.1	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³
Vanadium	24.9	5.5	mg/kg	1	09/06/18	09/07/18 RP	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA45217
- (2) Instrument QC Batch: MA45220
- (3) Prep QC Batch: MP8968

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: ID007	Date Sampled: 09/05/18
Lab Sample ID: JC73132-2A	Date Received: 09/05/18
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	127	1.5	mg/kg	1	09/07/18 15:37	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180905)		Date Sampled: 09/05/18
Lab Sample ID: JC73132-4A		Date Received: 09/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/06/18	09/06/18	MET SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/06/18	09/06/18	MET SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/06/18	09/06/18	MET SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/06/18	09/06/18	MET SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/06/18	09/06/18	MET SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45212

(2) Prep QC Batch: MP8965

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20180905)	Date Sampled: 09/05/18
Lab Sample ID: JC73132-4A	Date Received: 09/05/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/06/18 20:20	MET	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC73506, JC73585, and JC73658

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32678R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC73506, JC73585, and JC73658 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC73506	FB(20180910)	JC73506-1	Water	9/10/2018		X	X	X
	BS-G12	JC73506-2	Soil	9/10/2018		X	X	X
	BS-H12	JC73506-3	Soil	9/10/2018		X	X	X
	BS-C12	JC73506-4	Soil	9/10/2018		X	X	X
	DUP-12(20180910)	JC73506-5	Soil	9/10/2018	BS-C12	X	X	X
JC73585	FB(20180911)	JC73585-1	Water	9/11/2018		X	X	X
	BS-F12	JC73585-2	Soil	9/11/2018		X	X	X
JC73658	FB(20180912)	JC73658-1	Water	9/12/2018		X	X	X
	BS-C13	JC73658-2	Soil	9/12/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC73506, JC73585, and JC73658: Miscellaneous parameters for samples BS-C12, BS-F12, and BS-C13 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDG #JC73506: The MS/MSD analysis performed on sample location BS-C12 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-C12	Antimony	61.1%	65.4%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

SDG #JC73585: The MS/MSD analysis was not performed using a sample from this SDG.

SDG #JC73658: The MS/MSD analysis performed on sample location BS-C13 exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC73506 and JC73658: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-C12, BS-C13. The MS/MSD recoveries exhibited acceptable RPDs.

SDG #JC73585: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-C12 / DUP-12(20180910)	Chromium	14.7	13.0	12.3%
	Trivalent Chromium	13.7	12.5	9.2%
	Nickel	13.4	9.7	AC
	Vanadium	22.4	19.6	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-C12 and field duplicate sample DUP-12(20180910) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC73506, JC73658: The serial dilution performed on sample location BS-C12, BS-C13 exhibited %D within control limits.

SDG #JC73585: The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC73506 and JC73585: The MS analysis performed on sample location BS-C12 and BS-F12 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC73506, JC73585 and JC73658: The MS analysis performed on sample locations BS-C12, BS-F12, and BS-C13 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-C12	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-F12	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-C13	Hexavalent Chromium, Insoluble	69.6%	69.0%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC73506, JC73585, and JC73658: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC73506, JC73585, and JC73658: The PDS analysis performed on sample locations BS-C12, BS-F12, and BS-C13 exhibited recoveries within the control limits.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC73506: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes
BS-C12	Hexavalent Chromium

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result < four times the RL	\pm RL	Non-detect	UJ
		Detect	J

SDGs #JC73585 and JC73658: The laboratory duplicate analysis performed on sample locations BS-F12 and BS-C13 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-C12 / DUP-12(20180910)	Hexavalent Chromium	1.0	0.48	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample BS-C12 and field duplicate sample DUP-12(20180910) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

DATA REVIEW REPORT

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-C12	ASTM D3872-86	Analysis: 4 days	< 24 hours from collection
BS-F12		Analysis: 3 days	
BS-C13		Analysis: 9 days	
BS-C13	SM4500S2-A	Analysis: 9 days	7 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method

DATA REVIEW REPORT

blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC73506, JC73585, and JC73658: The laboratory duplicate analysis performed on sample location BS-C12, BS-F12, and BS-C13 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-C12 / DUP-12(20180910)	Redox Potential	191	247	25.6%
	pH	7.07	7.13	0.8%

The differences in the results between the parent sample BS-C12 and field duplicate sample DUP-12(20180910) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 7, 2019

PEER REVIEW: Dennis Capria

DATE: May 15, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsus

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # **JC 73506**

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)								Matrix Codes
Company Name ArcaA11		Project Name PPG Jersey City Site 107										Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium								DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Ave.																		
City State Zip Newtown PA 18440		City State Jersey City NJ																		
Project Contact Krista Mastroluca		Billing Information (if different from Report to) Company Name NP000770.0001.0005																		
Phone # 610 755 7080		Street Address NP000770.0001.0005																		
Samples Name(s) Christian Cifelli		Project # NP000770.0001.0005																		
Lab Sample #		Collection																		LAB USE ONLY
Field ID / Point of Collection		MECH/DI Vial #																		
Date		Time																		
Sampled by		Matrix																		
# of bottles		Number of preserved bottles																		
HCl		NaOH																		
HNO3		H2SO4																		
NONE		DI Water																		
MECH		ENCORE																		
ENCORE																				
1		FB(20180910)																		
2		BS-G12																		
3		BS-H12																		A40
4		BS-C12																		G55
5		DUP-12(20180910)																		
6		BS-C12 MS																		B9
7		BS-C12 MSD																		
Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions								
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary</small> <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>egus</i> <input type="checkbox"/> Other								INITIAL ASSESSMENT <i>38/18</i> LABEL VERIFICATION
Emergency & Rush T/A data available via LabLink		NJ Reduced = Results + QC Summary + Partial Raw data										Sample inventory is verified upon receipt in the Laboratory								
Relinquished by Sampler:		Date/Time:										Sample Custody must be documented below each time samples change possession, including courier delivery.								
1		Relinquished By: <i>[Signature]</i>										Received By: <i>[Signature]</i>								
3		Date/Time: <i>9/10/18 1412</i>										Received By: <i>[Signature]</i>								
5		Date/Time:										Received By: <i>[Signature]</i>								
Custody Seal # 29210		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact										<input type="checkbox"/> Preserved where applicable <input checked="" type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp. <i>2.3°C</i>								

5.2
5

Report of Analysis

Client Sample ID: FB(20180910)	Date Sampled: 09/10/18
Lab Sample ID: JC73506-1	Date Received: 09/10/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/10/18 21:43	LS	SW846 7196A
Redox Potential Vs H2	408		mv	1	09/11/18 17:06	KS	ASTM D1498-76
pH ^a	5.56		su	1	09/10/18 17:42	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-2	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J	0.46	mg/kg	1	09/12/18 11:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	205		mv	1	09/11/18 15:52	KS	ASTM D1498-76M
Solids, Percent	87.6		%	1	09/11/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.92		su	1	09/11/18 14:58	KS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-3	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.46	mg/kg	1	09/12/18 11:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	09/11/18 15:54	KS	ASTM D1498-76M
Solids, Percent	87.4		%	1	09/11/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.03		su	1	09/11/18 15:00	KS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-4	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J	0.46	mg/kg	1	09/12/18 11:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	191		mv	1	09/11/18 16:02	KS	ASTM D1498-76M
Solids, Percent	87.2		%	1	09/11/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.07		su	1	09/11/18 15:04	KS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-12(20180910)	Date Sampled: 09/10/18
Lab Sample ID: JC73506-5	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.48 J	0.46	mg/kg	1	09/12/18 11:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	247		mv	1	09/11/18 16:06	KS	ASTM D1498-76M
Solids, Percent	86.5		%	1	09/11/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.13		su	1	09/11/18 15:06	KS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-2R	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52	0.46	mg/kg	1	09/14/18 13:07	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-3R	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59	0.46	mg/kg	1	09/14/18 13:07	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-4R	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58	0.46	mg/kg	1	09/14/18 13:04	RI	SW846 3060A/7196A
Iron, Ferrous	0.98 J	0.20	%	1	09/14/18 11:00	MP	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	09/14/18 11:00	MP	SM4500S2- A-11
Total Organic Carbon	2820	110	mg/kg	1	09/17/18 13:49	CD	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-12(20180910)	Date Sampled: 09/10/18
Lab Sample ID: JC73506-5R	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	09/14/18 13:07	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20180910)		Date Sampled: 09/10/18
Lab Sample ID: JC73506-1A		Date Received: 09/10/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/11/18	09/12/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/11/18	09/12/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/11/18	09/12/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/11/18	09/12/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/11/18	09/12/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45240

(2) Prep QC Batch: MP9034

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180910)	Date Sampled: 09/10/18
Lab Sample ID: JC73506-1A	Date Received: 09/10/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/12/18 05:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 09/10/18
Lab Sample ID: JC73506-2A	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	13.0	1.1	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	9.3	4.3	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.5	5.4	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45239

(2) Prep QC Batch: MP9030

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G12		Date Sampled: 09/10/18
Lab Sample ID: JC73506-2A		Date Received: 09/10/18
Matrix: SO - Soil		Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.1	1.6	mg/kg	1	09/12/18 11:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12		Date Sampled: 09/10/18
Lab Sample ID: JC73506-3A		Date Received: 09/10/18
Matrix: SO - Soil		Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	13.4	1.1	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	10.6	4.5	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	5.7	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45239

(2) Prep QC Batch: MP9030

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H12		Date Sampled: 09/10/18
Lab Sample ID: JC73506-3A		Date Received: 09/10/18
Matrix: SO - Soil		Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.1	1.6	mg/kg	1	09/12/18 11:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C12		Date Sampled: 09/10/18
Lab Sample ID: JC73506-4A		Date Received: 09/10/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/11/18	09/11/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	14.7	1.2	mg/kg	1	09/11/18	09/11/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.4	4.7	mg/kg	1	09/11/18	09/11/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/11/18	09/11/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.4	5.9	mg/kg	1	09/11/18	09/11/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45239

(2) Prep QC Batch: MP9030

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C12		Date Sampled: 09/10/18
Lab Sample ID: JC73506-4A		Date Received: 09/10/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.7	1.7	mg/kg	1	09/12/18 11:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-12(20180910) Lab Sample ID: JC73506-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/18 Date Received: 09/10/18 Percent Solids: 86.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	13.0	1.2	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	9.7	4.7	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.6	5.9	mg/kg	1	09/11/18	09/12/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45239

(2) Prep QC Batch: MP9030

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-12(20180910)	Date Sampled: 09/10/18
Lab Sample ID: JC73506-5A	Date Received: 09/10/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	1.7	mg/kg	1	09/12/18 11:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20180911) Lab Sample ID: JC73585-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/11/18 Date Received: 09/11/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	514		mv	1	09/12/18 10:05	KS	ASTM D1498-76
pH ^a	5.54		su	1	09/11/18 17:00	GE	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F12	Date Sampled: 09/11/18
Lab Sample ID: JC73585-2	Date Received: 09/11/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	259		mv	1	09/12/18 11:20	KS	ASTM D1498-76M
Solids, Percent	89.9		%	1	09/12/18 09:30	RC	SM2540 G 18TH ED MOD
pH	8.11		su	1	09/12/18 11:31	KS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180911)		Date Sampled: 09/11/18
Lab Sample ID: JC73585-1A		Date Received: 09/11/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/12/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/12/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/12/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/12/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/12/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45246

(2) Prep QC Batch: MP9042

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180911)		Date Sampled: 09/11/18
Lab Sample ID: JC73585-1A		Date Received: 09/11/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/11/18 20:47	LS	SW846 7196A
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/13/18 01:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F12		Date Sampled: 09/11/18
Lab Sample ID: JC73585-2A		Date Received: 09/11/18
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	28.8	2.3	mg/kg	1	09/12/18	09/12/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10.1	1.1	mg/kg	1	09/12/18	09/12/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	19.1	4.6	mg/kg	1	09/12/18	09/12/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/12/18	09/12/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	13.4	5.7	mg/kg	1	09/12/18	09/12/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45247

(2) Prep QC Batch: MP9053A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F12		Date Sampled: 09/11/18
Lab Sample ID: JC73585-2A		Date Received: 09/11/18
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J-	0.44	mg/kg	1	09/12/18 16:10	RI	SW846 3060A/7196A
Chromium, Trivalent ^a	9.2	1.5	mg/kg	1	09/12/18 16:10	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F12	Date Sampled: 09/11/18
Lab Sample ID: JC73585-2R	Date Received: 09/11/18
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	09/14/18 15:55	RI	SW846 3060A/7196A
Iron, Ferrous	0.47 J	0.20	%	1	09/14/18 11:00	MP	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	09/14/18 11:00	MP	SM4500S2- A-11
Total Organic Carbon ^a	8340	110	mg/kg	1	09/17/18 14:46	CD	LLOYD KAHN 1988 MOD

(a) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.1
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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FEDEX Tracking # 15082418173
SGS Order # 3C73658
SGS Job #

Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, Collection table, Turn Around Time, Deliverable, Comments/Special Instructions, Sample Custody, Relinquished, Retained, Date/Time, Received By, Custody Seal #, Intact, Preserved where applicable, Therm. ID, Cooler Temp.

5.2 5

E

JC73658: Chain of Custody

Page 1 of 3



Report of Analysis

Client Sample ID: FB(20180912)		Date Sampled: 09/12/18
Lab Sample ID: JC73658-1		Date Received: 09/12/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	660		mv	1	09/13/18 10:15	KS	ASTM D1498-76
pH ^a	5.60		su	1	09/12/18 16:43	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C13		Date Sampled: 09/12/18
Lab Sample ID: JC73658-2		Date Received: 09/12/18
Matrix: SO - Soil		Percent Solids: 71.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Redox Potential Vs H2	313		mv	1	09/13/18 12:35	KS	ASTM D1498-76M
Solids, Percent	71.8		%	1	09/13/18 14:15	LV	SM2540 G 18TH ED MOD
pH	6.34		su	1	09/13/18 12:14	KS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20180912)		Date Sampled: 09/12/18
Lab Sample ID: JC73658-1A		Date Received: 09/12/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/13/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/13/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/13/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/13/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/13/18	09/13/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45252

(2) Prep QC Batch: MP9075

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20180912)		Date Sampled: 09/12/18
Lab Sample ID: JC73658-1A		Date Received: 09/12/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/12/18 18:47	LS	SW846 7196A
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/13/18 18:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C13		Date Sampled: 09/12/18
Lab Sample ID: JC73658-2A		Date Received: 09/12/18
Matrix: SO - Soil		Percent Solids: 71.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	09/13/18	09/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	65.2	1.4	mg/kg	1	09/13/18	09/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	5.5	mg/kg	1	09/13/18	09/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	09/13/18	09/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.9	6.8	mg/kg	1	09/13/18	09/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45252

(2) Prep QC Batch: MP9079

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C13		Date Sampled: 09/12/18
Lab Sample ID: JC73658-2A		Date Received: 09/12/18
Matrix: SO - Soil		Percent Solids: 71.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	09/14/18 14:52	RI	SW846 3060A/7196A
Chromium, Trivalent ^a	65.2	2.0	mg/kg	1	09/14/18 14:52	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C13		Date Sampled: 09/12/18
Lab Sample ID: JC73658-2R		Date Received: 09/12/18
Matrix: SO - Soil		Percent Solids: 71.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	09/19/18 16:28	RI	SW846 3060A/7196A
Iron, Ferrous ^a	0.80 J	0.20	%	1	09/21/18 11:15	ST	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE J			1	09/21/18	ST	SM4500S2- A-11
Total Organic Carbon	253000	140	mg/kg	1	09/20/18 12:54	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC75393

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32679R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC75393 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB (20181005)	JC75393-1	Water	10/5/2018		X	X	X
BS-D12D	JC75393-2	Soil	10/5/2018		X	X	X
BS-D13D	JC75393-3	Soil	10/5/2018		X	X	X
BS-E11D	JC75393-4	Soil	10/5/2018		X	X	X
BS-E12D	JC75393-5	Soil	10/5/2018		X	X	X
BS-E13D	JC75393-6	Soil	10/5/2018		X	X	X
BS-F11D	JC75393-7	Soil	10/5/2018		X	X	X
BS-F12D	JC75393-8	Soil	10/5/2018		X	X	X
BS-F13D	JC75393-9	Soil	10/5/2018		X	X	X
DUP-13 (20181005)	JC75393-10	Soil	10/5/2018	BS-D12D	X	X	X
DUP-14 (20181005)	JC75393-11	Soil	10/5/2018	BS-E12D	X	X	X
CS-E12	JC75393-12	Soil	10/5/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Metals analysis for samples BS-E13D and BS-F13D also includes SPLP nickel.
5. Miscellaneous parameters for sample BS-D13D also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil/SPLP Leachate	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location BS-C12 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-D13D	Antimony	65.8%	60.7%
BS-E11D	Antimony	65.4%	66.7%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-D13D and BS-E11D. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12D / DUP-13 (20181005)	Chromium	15.3	34.5	77.1%
	Chromium, Trivalent	13.6	34.5	86.9%
	Nickel	21.7	38.8	AC
	Vanadium	19.1	28.6	
BS-E12D / DUP-14 (20181005)	Chromium	13.0	12.9	0.8%
	Chromium, Trivalent	11.6	12.1	4.2%
	Nickel	11.0	11.9	AC
	Vanadium	19.3	20.5	

Notes:

AC = Acceptable

The chromium and trivalent chromium results associated with sample locations BS-D12D and DUP-13 (20181005) exhibited field duplicate RPDs greater than the control limit. The associated sample results were qualified as estimated.

The differences in the results between the parent sample BS-E12D and field duplicate sample DUP-14 (20181005) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

DATA REVIEW REPORT

The serial dilution performed on sample locations BS-D13D and BS-E11D exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location BS-E11D in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample locations BS-D13D and BS-E11D exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-D13D	Hexavalent Chromium, Insoluble	< 50%	< 50%
	Hexavalent Chromium, Soluble	< 50%	59.5%
BS-E11D	Hexavalent Chromium, Soluble	< 50%	AC (84.6%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The reanalysis of the field samples are usable with appropriate qualification. No sample results were rejected. No qualifiers were assigned to the hexavalent chromium results in sample BS-E11D since the MS recovery was within the acceptance limits in the reanalysis.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

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The PDS analysis performed on sample locations BS-D13D and BS-E11D exhibited recoveries within the control limits. Note that the PDS recovery was less than the acceptance limit in the original analysis of sample BS-D13D, however, the results were reported from the reanalysis based on the MS recoveries.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-D13D and BS-E11D exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12D / DUP-13 (20181005)	Hexavalent Chromium	1.7	0.62 U	AC
BS-E12D / DUP-14 (20181005)	Hexavalent Chromium	1.4	0.83	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-D12D and field duplicate sample DUP-13 (20181005) were acceptable.

The differences in the results between the parent sample BS-E12D and field duplicate sample DUP-14 (20181005) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-D12D BS-D13D BS-E11D BS-E12D BS-E13D BS-F11D BS-F12D BS-F13D DUP-13 (20181005) DUP-14 (20181005) CS-E12	SW846 9045D	Analysis: 2 days	Within 24 hours of receipt
BS-D13D	ASTM D3872-86	Analysis: 14 days	< 24 hours from collection
BS-D13D	SM4500S2-A	Analysis: 9 days	7 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location BS-D13D and BS-E11D exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D12D / DUP-13 (20181005)	Redox Potential	174	221	23.8%
	pH	6.23	6.41	2.8%
BS-E12D / DUP-14 (20181005)	Redox Potential	150	169	11.9%
	pH	6.69	6.64	0.8%

The differences in the results between the parent sample BS-D12D and field duplicate sample DUP-13 (20181005) were acceptable.

The differences in the results between the parent sample BS-E12D and field duplicate sample DUP-14 (20181005) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 7, 2019

PEER REVIEW: Dennis Capria

DATE: May 15, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SD
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsus

FED-EX Tracking #
SGS Quote #
Order Contract # **LS-0824A-175**
SGS Job # **JC75393**

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes							
Company Name: Accadia		Project Name: PPG Seesay City Site				Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium Total Chromium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank							
Street Address: 10 Friendly Lane Suite 200		Street: 18 Chapel Ave.																					
City: Newtown PA State: PA Zip: 18440		City: Seesay City NJ State: NJ																					
Project Contact: Krista Melrocola E-mail: KMelrocola@accadia.com Phone #: 610.755.7030		Project #: N800770001.00013																					
Sampling Name(s): Christina C. Gilling, Jessica Dorse Phone #: 610.755.7030		Project Manager: Jim McLaughlin																					
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection		Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY					
			Date	Time				HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	H ₂ O ₂	NONE	DI Water	MEDH	ENCORE							
1	FB(20181005)		10/5/18	0755	JD	FB	4			2	2												
2	BS-D12 D		10/5/18	1020	CG	SD	1					1											637
3	BS-D13 D		10/5/18	1030	CG	SD	1					1											
4	BS-E11 D		10/5/18	1110	CG	SD	1					1											
5	BS-E12 D		10/5/18	1055	CG	SD	1					1											A38
6	BS-E13 D		10/5/18	1105	CG	SD	1					1											M18
7	BS-E11 D		10/5/18	1125	CG	SD	1					1											
8	BS-E12 D		10/5/18	1135	CG	SD	1					1											
9	BS-E13 D		10/5/18	1145	CG	SD	1					1											
10	DUP-13(20181005)		10/5/18	-	CG	SD	1					1											
11	DUP-14(20181005)		10/5/18	-	CG	SD	1					1											
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:				Data Deliverable Information										Comments / Special Instructions							
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULL T1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equis</i> <input type="checkbox"/> Other _____										INITIAL ASSESSMENT <i>AL 928</i> LABEL VERIFICATION _____							
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary; NJ Reduced = Results + QC Summary + Partial Raw data				Sample inventory is verified upon receipt in the Laboratory																	
Sample Custody must be documented below each time samples change possession, including courier delivery.																							
1	Relinquished by: _____	Date Time: 10/5/18 1400	Received By: Robert Schaubert	Date Time: _____	Relinquished by: Robert Schaubert	Date Time: 1553	Received By: _____	Date Time: _____															
3	Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____	Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____															
5	Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____	Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____															
Custody Seal # 079934		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable <input type="checkbox"/>		On Ice <input type="checkbox"/>		Cooler Temp: A 1p 3.20c															

5.2
5



Report of Analysis

Client Sample ID: FB (20181005)	Date Sampled: 10/05/18
Lab Sample ID: JC75393-1	Date Received: 10/05/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/05/18 20:20	LS	SW846 7196A
Redox Potential Vs H2	268		mv	1	10/07/18 14:32	RB	ASTM D1498-76
pH ^a	4.66		su	1	10/05/18 17:30	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D12D Lab Sample ID: JC75393-2 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/05/18 Date Received: 10/05/18 Percent Solids: 77.0
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	10/08/18 10:20	DC	SW846 3060A/7196A
Redox Potential Vs H2	174		mv	1	10/07/18 14:40	RB	ASTM D1498-76M
Solids, Percent	77		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	6.23 J		su	1	10/07/18 14:23	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-3	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	10/08/18 10:15	DC	SW846 3060A/7106A
Redox Potential Vs H2	172		mv	1	10/07/18 14:41	RB	ASTM D1498-76M
Solids, Percent	84.5		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	7.20 J		su	1	10/07/18 14:30	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E11D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-4	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60	0.49	mg/kg	1	10/09/18 15:40	DC	SW846 3060A/7196A
Redox Potential Vs H2	189		mv	1	10/07/18 14:45	RB	ASTM D1498-76M
Solids, Percent	80.9		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	7.69 J		su	1	10/07/18 14:35	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E12D Lab Sample ID: JC75393-5 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/05/18 Date Received: 10/05/18 Percent Solids: 81.6
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83	0.49	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	150		mv	1	10/07/18 14:57	RB	ASTM D1498-76M
Solids, Percent	81.6		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	6.69 J		su	1	10/07/18 14:38	RB	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-E13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-6	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.9	0.51	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	10/07/18 15:09	RB	ASTM D1498-76M
Solids, Percent	78.9		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	7.36 J		su	1	10/07/18 14:40	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F11D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-7		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	196		mv	1	10/07/18 15:19	RB	ASTM D1498-76M
Solids, Percent	84.9		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	7.13 J		su	1	10/07/18 14:44	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-8	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.50	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	151		mv	1	10/07/18 15:23	RB	ASTM D1498-76M
Solids, Percent	80.8		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	8.49 J		su	1	10/07/18 14:56	RB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-9	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.3	0.48	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	212		mv	1	10/07/18 15:27	RB	ASTM D1498-76M
Solids, Percent	84.1		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	8.52 J		su	1	10/07/18 14:58	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-13 (20181005)	Date Sampled: 10/05/18
Lab Sample ID: JC75393-10	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.62	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	221		mv	1	10/07/18 15:30	RB	ASTM D1498-76M
Solids, Percent	64.5		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	6.41 J		su	1	10/07/18 15:02	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-14 (20181005)	Date Sampled: 10/05/18
Lab Sample ID: JC75393-11	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.49	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	169		mv	1	10/07/18 15:39	RB	ASTM D1498-76M
Solids, Percent	82.2		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	6.64 J		su	1	10/07/18 15:05	RB	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: CS-E12	Date Sampled: 10/05/18
Lab Sample ID: JC75393-12	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.5	0.61	mg/kg	1	10/09/18 15:45	DC	SW846 3060A/7196A
Redox Potential Vs H2	171		mv	1	10/07/18 15:40	RB	ASTM D1498-76M
Solids, Percent	65.6		%	1	10/06/18 13:15	LV	SM2540 G 18TH ED MOD
pH	9.01 J		su	1	10/07/18 15:09	RB	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: BS-D12D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-2R		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.52	mg/kg	1	10/12/18 15:05	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-3R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67 J-	0.47	mg/kg	1	10/12/18 16:04	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-3RT	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.3 J	0.20	%	1	10/19/18 11:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE U			1	10/19/18 11:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	40800	120	mg/kg	1	10/19/18 20:42	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E11D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-4R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.78	0.49	mg/kg	1	10/12/18 15:55	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-5R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.49	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-6R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.5 J-	0.51	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F11D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-7R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-8R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67 J-	0.50	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-9R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6 J-	0.48	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-13 (20181005)	Date Sampled: 10/05/18
Lab Sample ID: JC75393-10R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.62 UJ-	0.62	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-14 (20181005)	Date Sampled: 10/05/18
Lab Sample ID: JC75393-11R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J-	0.49	mg/kg	1	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: CS-E12	Date Sampled: 10/05/18
Lab Sample ID: JC75393-12R	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 3.0 UJ-	3.0	mg/kg	5	10/12/18 16:03	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB (20181005) Lab Sample ID: JC75393-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/05/18 Date Received: 10/05/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45416

(2) Prep QC Batch: MP9521

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20181005)		Date Sampled: 10/05/18
Lab Sample ID: JC75393-1A		Date Received: 10/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/08/18 15:09	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-2A	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	15.3 J	1.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	21.7	5.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.1	6.8	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D12D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-2A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.6 14.8 J	1.9	mg/kg	1	10/08/18 19:20	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D13D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-3A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	64.4	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	17.1	4.8	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.5	6.0	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D13D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-3A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	64.4 63.7	1.7	mg/kg	1	10/08/18 20:08	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E11D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-4A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	8.8	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	10.3	4.9	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	10.4	6.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E11D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-4A	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.2 8.0	1.7	mg/kg	1	10/09/18 15:40	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E12D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-5A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	13.0	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.0	4.8	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	6.0	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-5A	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.2 11.6	1.7	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E13D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-6A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	547	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	811	4.9	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 6.1	6.1	mg/kg	5	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.2	6.1	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-E13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-6A	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	538 540	1.7	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F11D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-7A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	13.1	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	10.4	4.7	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.9	5.8	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F11D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-7A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.7 13.1	1.7	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F12D Lab Sample ID: JC75393-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/05/18 Date Received: 10/05/18 Percent Solids: 80.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	15.3	1.3	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	5.1	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.9	6.3	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F12D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-8A	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.3 14.6	1.8	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F13D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-9A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	4.4 J-	2.4	mg/kg	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	92.4	1.2	mg/kg	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	368	4.9	mg/kg	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	6.1	mg/kg	1	10/07/18	10/08/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: BS-F13D		Date Sampled: 10/05/18
Lab Sample ID: JC75393-9A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	86.1 89.8	1.7	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: DUP-13 (20181005)		Date Sampled: 10/05/18
Lab Sample ID: JC75393-10A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0 UJ-	3.0	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	34.5 J	1.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	38.8	6.0	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.6	7.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: DUP-13 (20181005)		Date Sampled: 10/05/18
Lab Sample ID: JC75393-10A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 64.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.5 33.1 J	2.1	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-14 (20181005)		Date Sampled: 10/05/18
Lab Sample ID: JC75393-11A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	12.9	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.9	4.9	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.5	6.1	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: DUP-14 (20181005)		Date Sampled: 10/05/18
Lab Sample ID: JC75393-11A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.3 12.1	1.7	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-E12		Date Sampled: 10/05/18
Lab Sample ID: JC75393-12A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1 UJ-	3.1	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	123	1.6	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	647	6.2	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 4.7	4.7	mg/kg	3	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	13.8	7.8	mg/kg	1	10/07/18	10/08/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45417

(2) Prep QC Batch: MP9528

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-E12		Date Sampled: 10/05/18
Lab Sample ID: JC75393-12A		Date Received: 10/05/18
Matrix: SO - Soil		Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	121 123	2.2	mg/kg	1	10/09/18 15:45	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E13D Lab Sample ID: JC75393-6AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/05/18 Date Received: 10/05/18 Percent Solids: 78.9
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Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	28.0		10	ug/l	1	10/13/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45466

(2) Prep QC Batch: MP9651

RL = Reporting Limit
 MCL = Maximum Contamination Level (not available)

4.1
4

Report of Analysis

Client Sample ID: BS-E13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-6AR	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.96		su	1	10/13/18 10:15	BM	SW846 1312
Volume, SPLP Leachate	2.004		l	1	10/13/18 10:15	BM	SW846 1312
Weight, SPLP Leachate	0.1002		kg	1	10/13/18 10:15	BM	SW846 1312
Dry Weight, SPLP Leachate	0.07906		kg	1	10/13/18 10:15	BM	SW846 1312

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-9AR	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	50.1		10	ug/l	1	10/13/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45466

(2) Prep QC Batch: MP9651

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

4.2
4

Report of Analysis

Client Sample ID: BS-F13D	Date Sampled: 10/05/18
Lab Sample ID: JC75393-9AR	Date Received: 10/05/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	9.03		su	1	10/13/18 10:15	BM	SW846 1312
Volume, SPLP Leachate	2.000		l	1	10/13/18 10:15	BM	SW846 1312
Weight, SPLP Leachate	0.1000		kg	1	10/13/18 10:15	BM	SW846 1312
Dry Weight, SPLP Leachate	0.08412		kg	1	10/13/18 10:15	BM	SW846 1312

RL = Reporting Limit

4.2
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC75641, JC75836, JC75925, and JC75986

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32680R

Review Level: Tier III

Project: NP000770.0002.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC75641, JC75836, JC75925, and JC75986 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC75641	FB(20181010)	JC75641-1	Water	10/10/2018		X	X	X
	BS-C14	JC75641-2	Soil	10/10/2018		X	X	X
	BS-D14	JC75641-3	Soil	10/10/2018		X	X	X
	BS-D15	JC75641-4	Soil	10/10/2018		X	X	X
JC75836	FB (20181012)	JC75836-1	Water	10/12/2018		X	X	X
	ID007	JC75836-2	Soil	10/12/2018		X	X	X
JC75925	FB(20181015)	JC75925-1	Water	10/15/2018		X	X	X
	BS-E15	JC75925-2	Soil	10/15/2018		X	X	X
	BS-E16	JC75925-3	Soil	10/15/2018		X	X	X
	BS-D16	JC75925-4	Soil	10/15/2018		X	X	X
	BS-E14	JC75925-5	Soil	10/15/2018		X	X	X
	DUP-15(20181015)	JC75925-6	Soil	10/15/2018	BS-D16	X	X	X
JC75986	FB(20181016)	JC75986-1	Water	10/16/2018		X	X	X
	BS-F14	JC75986-2	Soil	10/16/2018		X	X	X
	BS-F15	JC75986-3	Soil	10/16/2018		X	X	X
	BS-F16	JC75986-4	Soil	10/16/2018		X	X	X
	DUP-16(20181016)	JC75986-5	Soil	10/16/2018	BS-F16	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; Lloyd Kahn; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC75641 and JC75836: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC75925: The MS/MSD analysis performed on sample location BS-E14 exhibited recoveries within the control limits.

SDG #JC75986: The MS/MSD analysis performed on sample location BS-F15 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-F15	Antimony	49.3%	52.0%
	Chromium	61.4%	AC (86.4%)
	Nickel	< 30%	58.0%

Notes:

AC = Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC75641 and JC75836: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC75925 and JC75986: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-E14 and BS-F15. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D16 / DUP-15(20181015)	Chromium	146	318	74.1%
	Nickel	738	977	27.9%
	Trivalent Chromium	143	314	74.8%
	Vanadium	28.7	34.4	AC
BS-F16 / DUP-16(20181016)	Chromium	244	280	13.7%
	Nickel	1,060	489	73.7%
	Trivalent Chromium	242	272	11.7%
	Vanadium	23.9	21.3	AC

Notes:

AC = Acceptable

The chromium and trivalent chromium results associated with sample locations BS-D16 and DUP-15(20181015) exhibited field duplicate RPDs greater than the control limit. The associated sample results were qualified as estimated.

The nickel results associated with sample locations BS-F16 and DUP-16(20181016) exhibited field duplicate RPDs greater than the control limit. The associated sample results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC75641 and JC75836: The serial dilution analysis was not performed using a sample from these SDGs.

SDGs #JC75925 and JC75986: The serial dilution performed on sample locations BS-E14 and BS-F15 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC75836 and JC75986: The MS analysis performed on sample locations ID007 and BS-F15 in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC75641, JC75925: The MS analysis performed on sample location BS-C14, BS-E14 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC75641, JC75925: The MS analysis performed on sample locations BS-C14, BS-E14 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-C14	Hexavalent Chromium, Soluble	< 50%	NA
BS-E14	Hexavalent Chromium, Soluble	< 50%	< 50%

Notes:

NA = Reanalysis not performed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC75641 and JC75925: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

DATA REVIEW REPORT

SDGs #JC75641, JC75836, JC75925, and JC75986: The PDS analysis performed on sample locations BS-C14, ID007, BS-E14, and BD-F15 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC75641, JC75836, JC75925, and JC75986: The laboratory duplicate analysis performed on sample locations BS-C14, ID007, BS-E14, and BS-F15 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D16 / DUP-15(20181015)	Hexavalent Chromium	2.9	4.2	AC
BS-F15 / DUP-16(20181016)	Hexavalent Chromium	1.7	7.7	NC

Notes:

AC = Acceptable

NC = Not compliant

The difference in the hexavalent chromium results between the parent sample BS-D16 and field duplicate sample DUP-15(20181015) was acceptable.

The hexavalent chromium results associated with sample locations BS-F15 and DUP-16(20181016) were not in agreement. The associated sample results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-C14 BS-D14 BS-D15	SW846 9045D	Analysis: 2 days	< 24 hours of receipt
FB (20181012) ID007	SM4500H+B	Analysis: 4 days	< 24 hours of receipt

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

DATA REVIEW REPORT

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC75641: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC75836, JC75925, and JC75986: The laboratory duplicate analysis performed on sample locations FB (20181012), BS-E14, and BS-F15 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-D16 / DUP-15(20181015)	Redox Potential	379	283	29.0%
	pH	6.78	6.83	0.7%
BS-F16 / DUP-16(20181016)	Redox Potential	287	327	13.0%
	pH	7.42	7.46	0.5%

The differences in the results between the parent sample BS-D16 and field duplicate sample DUP-15(20181015) were acceptable.

The differences in the results between the parent sample BS-F16 and field duplicate sample DUP-16(20181016) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 7, 2019

PEER REVIEW: Dennis Capria

DATE: May 15, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/usa

FED-EA Tracking # _____
 Bids Order Control # **CS-092818-32**
 SGS Doc# **JC75641**

Client / Reporting Information		Project Information												Requested Analysis										Matrix Codes
Company Name: Arcadis		Project Name: FRD Site 107 (Jersey City)												Matrix Codes: DW - Drainage Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquids AFC - Air SOL - Other Solid WPI - Waste FB - Field Blank EB - Equipment Blank NB - Rinse Blank TB - Trip Blank										
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue				Billing Information (if different from Report to)																		
City, State, Zip: Newtown, PA 18440		City, State, Zip: Jersey City NJ				Company Name:																		
Project Contact: Krista Mastroteolo		Project #: NPO00770.0001				Street Address:																		
Phone #: 910.755.7080		Client Purchase Order #:				City, State, Zip:																		
Signature Name(s): Cynthia Buchanan		Project Manager: Jim McLaughlin, Jr.				Attention:																		
Lot #	Field ID / Point of Collection	METHOD / Vol	Collection				Number of preserved Bots												LAB USE ONLY					
			Date	Time	Sampled by	Lot #	MC	NH ₃	NO ₂	NO ₃	NO ₃ +	NO ₃ -	DNV ₂	MEQ	TOC	Total Chromium	Hexavalent Chromium	Treatment Chromium		Autonomy	Nickel	Thallium	Vanadium	
1	FB(20181010)		10/10/18	1400	CB	G	FB	4								X	X	X	X	X	X	X	A9	
2	BS-C14		10/10/18	1345	CB	G	SO	1								X	X	X	X	X	X	X	G57	
3	BS-D14		10/10/18	1410	CB	G	SO	1								X	X	X	X	X	X	X	D36	
4	BS-D15		10/10/18	1420	CB	G	SO	1								X	X	X	X	X	X	X		

INITIAL ASSESSMENT IB/JAD

LABEL VERIFICATION IB/JAD

5.2
5

CIP

3.7



PPG Site 107_Electronic COCs (version 1)

Report of Analysis

Client Sample ID: FB(20181010)	Date Sampled: 10/10/18
Lab Sample ID: JC75641-1	Date Received: 10/10/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/10/18 22:50	LS	SW846 7196A
Redox Potential Vs H2	428		mv	1	10/11/18 20:38	JO	ASTM D1498-76
pH ^a	6.32		su	1	10/11/18 20:24	JO	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C14	Date Sampled: 10/10/18
Lab Sample ID: JC75641-2	Date Received: 10/10/18
Matrix: SO - Soil	Percent Solids: 71.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	10/12/18 14:25	LS	SW846 3060A/7196A
Redox Potential Vs H2	329		mv	1	10/12/18 10:46	JOO	ASTM D1498-76M
Solids, Percent	71.4		%	1	10/11/18 08:49	RI	SM2540 G 18TH ED MOD
pH	6.92 J		su	1	10/12/18 10:46	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D14	Date Sampled: 10/10/18
Lab Sample ID: JC75641-3	Date Received: 10/10/18
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	10/12/18 14:27	LS	SW846 3060A/7196A
Redox Potential Vs H2	335		mv	1	10/12/18 10:48	JOO	ASTM D1498-76M
Solids, Percent	80.4		%	1	10/11/18 08:49	RI	SM2540 G 18TH ED MOD
pH	7.09 J		su	1	10/12/18 10:48	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D15	Date Sampled: 10/10/18
Lab Sample ID: JC75641-4	Date Received: 10/10/18
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	10/12/18 14:27	LS	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	10/12/18 10:51	JOO	ASTM D1498-76M
Solids, Percent	79.9		%	1	10/11/18 08:49	RI	SM2540 G 18TH ED MOD
pH	7.34 J		su	1	10/12/18 10:51	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20181010)		Date Sampled: 10/10/18
Lab Sample ID: JC75641-1A		Date Received: 10/10/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45446

(2) Prep QC Batch: MP9602

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181010)	Date Sampled: 10/10/18
Lab Sample ID: JC75641-1A	Date Received: 10/10/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/12/18 03:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C14		Date Sampled: 10/10/18
Lab Sample ID: JC75641-2A		Date Received: 10/10/18
Matrix: SO - Soil		Percent Solids: 71.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Chromium	32.4	1.4	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ² SW846 3050B ³
Nickel	23.1	5.4	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Thallium	< 1.4	1.4	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Vanadium	36.4	6.8	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ² SW846 3050B ³

- (1) Instrument QC Batch: MA45444
- (2) Instrument QC Batch: MA45452
- (3) Prep QC Batch: MP9616

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C14	Date Sampled: 10/10/18
Lab Sample ID: JC75641-2A	Date Received: 10/10/18
Matrix: SO - Soil	Percent Solids: 71.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.4	2.0	mg/kg	1	10/12/18 15:24	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D14		Date Sampled: 10/10/18
Lab Sample ID: JC75641-3A		Date Received: 10/10/18
Matrix: SO - Soil		Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3050B ³
Chromium	24.1	1.3	mg/kg	1	10/11/18	10/12/18	ND SW846 6010D ²	SW846 3050B ³
Nickel	21.4	5.0	mg/kg	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.3	1.3	mg/kg	1	10/11/18	10/12/18	ND SW846 6010D ¹	SW846 3050B ³
Vanadium	38.6	6.3	mg/kg	1	10/11/18	10/12/18	ND SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA45444
- (2) Instrument QC Batch: MA45452
- (3) Prep QC Batch: MP9616

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D14	Date Sampled: 10/10/18
Lab Sample ID: JC75641-3A	Date Received: 10/10/18
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1	1.8	mg/kg	1	10/12/18 15:28	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D15		Date Sampled: 10/10/18
Lab Sample ID: JC75641-4A		Date Received: 10/10/18
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Chromium	67.0	1.2	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ² SW846 3050B ³
Nickel	66.6	4.9	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ¹ SW846 3050B ³
Vanadium	46.9	6.1	mg/kg	1	10/11/18	10/12/18	ND	SW846 6010D ² SW846 3050B ³

- (1) Instrument QC Batch: MA45444
- (2) Instrument QC Batch: MA45452
- (3) Prep QC Batch: MP9616

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D15		Date Sampled: 10/10/18
Lab Sample ID: JC75641-4A		Date Received: 10/10/18
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	67.0	1.7	mg/kg	1	10/12/18 15:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

FED-EX Tracking #	Order Number
SGS Quote #	SGS Job #
	CS-091818-36
	JC75836

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)											Matrix Codes																
Company Name Accadia		Project Name PPA Jersey City Site 107				<table border="1"> <tr><td>Total Chromium</td><td>X</td></tr> <tr><td>Hexavalent Chromium</td><td>X</td></tr> <tr><td>Total Chromium</td><td>X</td></tr> <tr><td>Antimony</td><td>X</td></tr> <tr><td>Nickel</td><td>X</td></tr> <tr><td>Thallium</td><td>X</td></tr> <tr><td>Vanadium</td><td>X</td></tr> </table>											Total Chromium	X	Hexavalent Chromium	X	Total Chromium	X	Antimony	X	Nickel	X	Thallium	X	Vanadium	X	Matrix Codes		
Total Chromium	X																																
Hexavalent Chromium	X																																
Total Chromium	X																																
Antimony	X																																
Nickel	X																																
Thallium	X																																
Vanadium	X																																
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Ave.	Billing Information (if different from Report to)			DW - Drinking Water																											
City State Zip Newtown PA 18440		City State Jersey City NJ	Company Name			GW - Ground Water																											
Project Contact Krista Mastrecala		Project # MP000770.0001.0008	Street Address			WW - Water																											
Phone # 610.755.7080		Client Purchase Order #	City State Zip			SW - Surface Water																											
Sampler(s) Name(s) Christina Cifelli		Project Manager Jim McLaughlin	Attention:			SO - Soil																											
Lab Sample #		Field ID / Point of Collection		MEOH/IDVial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles											LAB USE ONLY												
	1	FB (20181012)			10/12/18	1230	CC	FB	4	HCl	HNO3	H2SO4	NONE	DI Water	MCHH	ENCORE	X	X	X	X	X	X	X	X									
	2	ID007			10/12/18	1145	CC	SO	1								X	X	X	X	X	X	X										
Turnaround Time (Business days)				Data Deliverable Information				Comments / Special Instructions																									
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____				Approved by (SGS Project Manager)/Date: _____ _____ _____				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equis</i> <input type="checkbox"/> Other _____				INITIAL ASSESSMENT <i>JR SA</i> LABEL VERIFICATION _____																	
Emergency & Rush TIA data available via LabLink				Sample Custody must be documented below each time samples change possession, including courier delivery.								Sample inventory is verified upon receipt in the Laboratory																					
Relinquished by Sampler: <i>CC Cifelli</i>		Date Time: 10/12/18 1417		Received By: <i>Robert Chambers</i>		Date Time: 10/12/18		Relinquished by: <i>Robert Chambers</i>		Date Time: 10/12/18		Received By: <i>Robert Chambers</i>		Date Time: 10/12/18		Relinquished by: 4		Date Time: 10/12/18		Received By: 4		Date Time: 10/12/18		Relinquished by: 5		Date Time: 10/12/18		Received By: 5		Date Time: 10/12/18		Received By: 5	

5.2
5

B21
D19
A13

Report of Analysis

Client Sample ID: FB (20181012) Lab Sample ID: JC75836-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/12/18 Date Received: 10/12/18 Percent Solids: n/a
--	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/12/18 22:45	LS	SW846 7196A
Redox Potential Vs H2	355		mv	1	10/15/18 12:33	RB	ASTM D1498-76
pH ^a	5.62 J		su	1	10/16/18 15:45	JOO	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ID007	Date Sampled: 10/12/18
Lab Sample ID: JC75836-2	Date Received: 10/12/18
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.48	mg/kg	1	10/16/18 12:39	DC	SW846 3060A/7196A
Redox Potential Vs H2	239		mv	1	10/16/18 14:40	JOO	ASTM D1498-76M
Solids, Percent	84.2		%	1	10/13/18 10:40	LV	SM2540 G 18TH ED MOD
pH	7.85 J		su	1	10/16/18 14:40	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB (20181012) Lab Sample ID: JC75836-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/12/18 Date Received: 10/12/18 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/15/18	10/15/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/15/18	10/15/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/15/18	10/15/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/15/18	10/15/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/15/18	10/15/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45460

(2) Prep QC Batch: MP9644

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20181012)	Date Sampled: 10/12/18
Lab Sample ID: JC75836-1A	Date Received: 10/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/15/18 23:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ID007		Date Sampled: 10/12/18
Lab Sample ID: JC75836-2A		Date Received: 10/12/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	10/14/18	10/16/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.6	1.2	mg/kg	1	10/14/18	10/16/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	4.8	mg/kg	1	10/14/18	10/16/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/14/18	10/16/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.0	6.1	mg/kg	1	10/14/18	10/16/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45459

(2) Prep QC Batch: MP9635

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: ID007		Date Sampled: 10/12/18
Lab Sample ID: JC75836-2A		Date Received: 10/12/18
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.6	1.7	mg/kg	1	10/16/18 12:39	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SF
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-328-0200 FAX: 732-328-3499/3480
www.sgs.com/ehsusa

E

FED-EX Tracking #
SGS Order # **PS-092818-28**
SGS Quote # **JC75925**

Client / Reporting Information			Project Information			Requested Analysis														Matrix Codes					
Company Name: Arcadis			Project Name: BRG Site 107 (Jersey City)																	DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank					
Street Address: 10 Friends Lane, Suite 200			Street: 18 Chapel Avenue																						
City, State, Zip: Newtown, PA 18840			City, State: Jersey City NJ																						
Project Contact: Krista Mastrocola			Project #: NP000770.0001																						
Phone #: 610.755.7080			Client Purchase Order #:																						
Sampler(s) Name(s): C. CIFELLI			Project Manager: Jim McLaughlin, Jr.																						
Field ID / Point of Collection			Date		Time		Sampled By		Matrix		A # of bottles		Number of preserved bottles												LAB USE ONLY
1 FB(20181015)			10/15/18		1300		CC G		FB		4														
2 BS-E15			10/15/18		1320		CC G		SO		1														
3 BS-E16			10/15/18		1330		CC G		SO		1														
4 BS-D16			10/15/18		1340		CC G		SO		1														
5 BS-E14			10/15/18		1350		CC G		SO		1														
6 BS-E14 MS/MSD			10/15/18		1350		CC G		SO		2														
7 DUP-15(20181015)			--		--		CC G		SO		1														
Turn Around Time (Business Days)			Approved By (SGS PM) / Date:			Deliverable			Comments / Special Instructions																
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other:						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP			<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equib_																
All data available via Lablink			Approval needed for 1-3 Business Day TAT			Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data			INITIAL ASSESSMENT AR 3A LABEL VERIFICATION _____ http://www.sgs.com/en/terms-and-conditions																
Relinquished by: [Signature]			Date / Time: 10-15-18			Received by: Robert Chambers			Date / Time: 10-15-18																
Relinquished by:			Date / Time:			Received by:			Date / Time:																
Relinquished by:			Date / Time:			Received by:			Date / Time:																
Relinquished by:			Date / Time:			Received by:			Date / Time:																
			Customer #			Intact			Preserved where applicable			On Ice <input type="checkbox"/> Cooler Temp. 3.2°C													
			281702			Intact			Absent			Therm ID:													

5.2
5



Report of Analysis

Client Sample ID: FB(20181015)		Date Sampled: 10/15/18
Lab Sample ID: JC75925-1		Date Received: 10/15/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/15/18 21:27	LS	SW846 7196A
Redox Potential Vs H2	362		mv	1	10/17/18 15:31	JOO	ASTM D1498-76
pH ^a	5.50		su	1	10/15/18 14:14	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E15	Date Sampled: 10/15/18
Lab Sample ID: JC75925-2	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.1 J-	0.61	mg/kg	1	10/17/18 15:23	DC	SW846 3060A/7196A
Redox Potential Vs H2	392		mv	1	10/16/18 14:23	JOO	ASTM D1498-76M
Solids, Percent	65.8		%	1	10/16/18 09:19	RC	SM2540 G 18TH ED MOD
pH	6.84		su	1	10/16/18 14:23	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E16	Date Sampled: 10/15/18
Lab Sample ID: JC75925-3	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.3 J-	0.60	mg/kg	1	10/17/18 15:23	DC	SW846 3060A/7196A
Redox Potential Vs H2	370		mv	1	10/16/18 14:25	JOO	ASTM D1498-76M
Solids, Percent	66.9		%	1	10/16/18 09:19	RC	SM2540 G 18TH ED MOD
pH	6.85		su	1	10/16/18 14:25	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D16	Date Sampled: 10/15/18
Lab Sample ID: JC75925-4	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 69.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9 J-	0.58	mg/kg	1	10/17/18 15:23	DC	SW846 3060A/7196A
Redox Potential Vs H2	379		mv	1	10/16/18 14:27	JOO	ASTM D1498-76M
Solids, Percent	69.3		%	1	10/16/18 09:19	RC	SM2540 G 18TH ED MOD
pH	6.78		su	1	10/16/18 14:27	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E14	Date Sampled: 10/15/18
Lab Sample ID: JC75925-5	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.60	mg/kg	1	10/17/18 15:20	DC	SW846 3060A/7196A
Redox Potential Vs H2	244		mv	1	10/16/18 14:30	JOO	ASTM D1498-76M
Solids, Percent	66.5		%	1	10/16/18 09:19	RC	SM2540 G 18TH ED MOD
pH	6.56		su	1	10/16/18 14:30	JOO	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-15(20181015)	Date Sampled: 10/15/18
Lab Sample ID: JC75925-6	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2 J-	0.61	mg/kg	1	10/17/18 15:23	DC	SW846 3060A/7196A
Redox Potential Vs H2	283		mv	1	10/16/18 14:39	JOO	ASTM D1498-76M
Solids, Percent	66		%	1	10/16/18 09:19	RC	SM2540 G 18TH ED MOD
pH	6.83		su	1	10/16/18 14:39	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E15	Date Sampled: 10/15/18
Lab Sample ID: JC75925-2R	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.61	mg/kg	1	10/22/18 13:29	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E16	Date Sampled: 10/15/18
Lab Sample ID: JC75925-3R	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.6	0.60	mg/kg	1	10/22/18 13:29	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D16	Date Sampled: 10/15/18
Lab Sample ID: JC75925-4R	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 69.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.58	0.58	mg/kg	1	10/22/18 13:29	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E14	Date Sampled: 10/15/18
Lab Sample ID: JC75925-5R	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.60	0.60	mg/kg	1	10/22/18 13:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-15(20181015)	Date Sampled: 10/15/18
Lab Sample ID: JC75925-6R	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 66.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.1	0.61	mg/kg	1	10/22/18 13:29	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20181015)		Date Sampled: 10/15/18
Lab Sample ID: JC75925-1A		Date Received: 10/15/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45466

(2) Prep QC Batch: MP9680

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181015)	Date Sampled: 10/15/18
Lab Sample ID: JC75925-1A	Date Received: 10/15/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/17/18 08:15	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E15	Date Sampled: 10/15/18
Lab Sample ID: JC75925-2A	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	387	1.5	mg/kg	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	734	5.8	mg/kg	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 7.3	7.3	mg/kg	5	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	58.0	7.3	mg/kg	1	10/16/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45473

(2) Prep QC Batch: MP9682

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E15	Date Sampled: 10/15/18
Lab Sample ID: JC75925-2A	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.2
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	368	2.1	mg/kg	1	10/17/18 15:23	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E16		Date Sampled: 10/15/18
Lab Sample ID: JC75925-3A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 31	31	mg/kg	10	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium ^a	575	16	mg/kg	10	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	3530	62	mg/kg	10	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 16	16	mg/kg	10	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	61.6	7.8	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45473

(2) Prep QC Batch: MP9682

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E16		Date Sampled: 10/15/18
Lab Sample ID: JC75925-3A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	572	17	mg/kg	1	10/17/18 15:23	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D16		Date Sampled: 10/15/18
Lab Sample ID: JC75925-4A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 69.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	146 J	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	738	6.0	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	28.7	7.4	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45473

(2) Prep QC Batch: MP9682

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D16	Date Sampled: 10/15/18
Lab Sample ID: JC75925-4A	Date Received: 10/15/18
Matrix: SO - Soil	Percent Solids: 69.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	143 J	2.1	mg/kg	1	10/17/18 15:23	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E14		Date Sampled: 10/15/18
Lab Sample ID: JC75925-5A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.7	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	455	6.0	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.8	7.4	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45473

(2) Prep QC Batch: MP9682

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-E14		Date Sampled: 10/15/18
Lab Sample ID: JC75925-5A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.1	2.1	mg/kg	1	10/17/18 15:20	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-15(20181015) Lab Sample ID: JC75925-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/15/18 Date Received: 10/15/18 Percent Solids: 66.0
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	318 J	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	977	6.1	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	34.4	7.6	mg/kg	1	10/16/18	10/17/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45473

(2) Prep QC Batch: MP9682

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-15(20181015)		Date Sampled: 10/15/18
Lab Sample ID: JC75925-6A		Date Received: 10/15/18
Matrix: SO - Soil		Percent Solids: 66.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	314 J	2.1	mg/kg	1	10/17/18 15:23	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-328-0200 FAX: 732-328-3489/3480
www.sgs.com/usausa

JC75986 E

Client / Reporting Information		Project Information		Requested Analysis		Matrix Codes	
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)		Bottle Order Control # LS-092818-36		Bottle Order Control # LS-092818-36	
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue		SGS Order #		SGS Job #	
City, State, Zip Newtown, PA 18440		City, State Jersey City NJ		Billing Information (if different from Report to)		DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SD - Soil SED - Sediment OI - Oil LQ - Other Liquid AR - Air WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Project Contact Krista Mastrosolo		Project # NP000770.0001		City		State	
Phone # 610.755.7080		Client Purchase Order #		City		State	
Sample(s) Name(s) C. CIFPELLI		Project Manager Jim McLaughlin, Jr.		City		State	
Field ID / Point of Collection		Collection		Number of preserved bottles		LAB USE ONLY	
1	FB(20181016)	10/16/18	1140	CC	G	FB	4
2	BS-F14	10/16/18	1200	CC	G	SO	1
3	BS-F15	10/16/18	1215	CC	G	SO	1
4	BS-F16	10/16/18	1230	CC	G	SO	1
5	BS-F15 MS/MSD	10/16/18	1215	CC	G	SO	2
6	DUP-16(20181016)	-	-	CC	G	SO	1
Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions		Initial Assessment CEM	
<input type="checkbox"/> 18 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DVGOP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format_Equity		<input type="checkbox"/> DQG-QSMS Label Verification	
Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data		http://www.sgs.com/en/terms-and-conditions		Sample Custody must be documented below each time samples change possession, including courier delivery.	
Relinquished by: gdn	Date / Time: 10/16/18 1420	Received by: Robert Chabrowski	Date / Time: 1600	Relinquished by: Robert Chabrowski	Date / Time: 1600	Received by: [Signature]	Date / Time: 1600
Relinquished by:	Date / Time:	Received by:	Date / Time:	Relinquished by:	Date / Time:	Received by:	Date / Time:
Relinquished by:	Date / Time:	Received by:	Date / Time:	Custody Seal #	Intact <input type="checkbox"/> Not Intact <input type="checkbox"/>	Preserved where applicable	Theme ID: JOB 3200

PPG Site 107_Electronic COCs (002)



5.2
5

Report of Analysis

Client Sample ID: FB(20181016)		Date Sampled: 10/16/18
Lab Sample ID: JC75986-1		Date Received: 10/16/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/16/18 23:11	LS	SW846 7196A
Redox Potential Vs H2	375		mv	1	10/17/18 15:36	JOO	ASTM D1498-76
pH ^a	5.56		su	1	10/16/18 16:59	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F14	Date Sampled: 10/16/18
Lab Sample ID: JC75986-2	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 70.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.57	mg/kg	1	10/18/18 14:35	LS	SW846 3060A/7196A
Redox Potential Vs H2	284		mv	1	10/17/18 16:53	JO	ASTM D1498-76M
Solids, Percent	70.5		%	1	10/17/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.24		su	1	10/17/18 16:53	JO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F15	Date Sampled: 10/16/18
Lab Sample ID: JC75986-3	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.6	0.55	mg/kg	1	10/18/18 14:30	LS	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	10/17/18 16:57	JO	ASTM D1498-76M
Solids, Percent	72.4		%	1	10/17/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.75		su	1	10/17/18 16:57	JO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F16	Date Sampled: 10/16/18
Lab Sample ID: JC75986-4	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J	0.52	mg/kg	1	10/18/18 14:35	LS	SW846 3060A/7196A
Redox Potential Vs H2	287		mv	1	10/17/18 16:59	JO	ASTM D1498-76M
Solids, Percent	76.2		%	1	10/17/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.42		su	1	10/17/18 16:59	JO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-16(20191016)	Date Sampled: 10/16/18
Lab Sample ID: JC75986-5	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 70.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.7 J	0.57	mg/kg	1	10/18/18 14:35	LS	SW846 3060A/7196A
Redox Potential Vs H2	327		mv	1	10/17/18 17:08	JO	ASTM D1498-76M
Solids, Percent	70.6		%	1	10/17/18 09:45	RC	SM2540 G 18TH ED MOD
pH	7.46		su	1	10/17/18 17:08	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20181016)		Date Sampled: 10/16/18
Lab Sample ID: JC75986-1A		Date Received: 10/16/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45480

(2) Prep QC Batch: MP9692

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181016)	Date Sampled: 10/16/18
Lab Sample ID: JC75986-1A	Date Received: 10/16/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/17/18 16:00	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F14		Date Sampled: 10/16/18
Lab Sample ID: JC75986-2A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 70.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 5.9 UJ-	5.9	mg/kg	2	10/17/18	10/18/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	1220 J-	3.0	mg/kg	2	10/17/18	10/18/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	133 J-	5.9	mg/kg	1	10/17/18	10/17/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/17/18	10/17/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium ^a	30.3	15	mg/kg	2	10/17/18	10/18/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA45480

(2) Prep QC Batch: MP9696

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F14		Date Sampled: 10/16/18
Lab Sample ID: JC75986-2A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 70.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1220 J-	3.6	mg/kg	1	10/18/18 14:35	LS	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F15		Date Sampled: 10/16/18
Lab Sample ID: JC75986-3A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	164 J-	1.4	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ³
Nickel	226 J-	5.6	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.4	1.4	mg/kg	1	10/17/18	10/18/18 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	37.3	7.0	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA45480
- (2) Instrument QC Batch: MA45482
- (3) Prep QC Batch: MP9696

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F15		Date Sampled: 10/16/18
Lab Sample ID: JC75986-3A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	154 J-	2.0	mg/kg	1	10/18/18 14:30	LS	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F16		Date Sampled: 10/16/18
Lab Sample ID: JC75986-4A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	244 J-	1.4	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	1060 J-	5.4	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.9	6.8	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45480

(2) Prep QC Batch: MP9696

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F16	Date Sampled: 10/16/18
Lab Sample ID: JC75986-4A	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	242 J-	1.9	mg/kg	1	10/18/18 14:35	LS	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-16(20191016)		Date Sampled: 10/16/18
Lab Sample ID: JC75986-5A		Date Received: 10/16/18
Matrix: SO - Soil		Percent Solids: 70.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0 UJ-	3.0	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	280 J-	1.5	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	489 J-	5.9	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.3	7.4	mg/kg	1	10/17/18	10/17/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45480

(2) Prep QC Batch: MP9696

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-16(20191016)	Date Sampled: 10/16/18
Lab Sample ID: JC75986-5A	Date Received: 10/16/18
Matrix: SO - Soil	Percent Solids: 70.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	272 J-	2.1	mg/kg	1	10/18/18 14:35	LS	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC74360, JC75269, and JC75510

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32750R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC74360, JC75269, and JC75510 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC74360	FB (20180921)	JC74360-1	Water	9/21/2018		X	X	X
	SW-D5 (10.0-10.5) A	JC74360-2	Soil	9/21/2018			X	
JC75269	FB(20181004)	JC75269-1	Water	10/4/2018		X	X	X
	SW-D12(2.2-2.7)	JC75269-2	Soil	10/4/2018		X	X	X
	SW-D12(4.0-4.5)	JC75269-3	Soil	10/4/2018		X	X	X
	SW-D12(6.0-6.5)	JC75269-4	Soil	10/4/2018		X	X	X
JC75510	FB(20181004)	JC75510-1	Water	10/8/2018		X	X	X
	DUP-6(20181008)	JC75510-4	Soil	10/8/2018	SW-D7A(6.0-6.5)		X	
	SW-D7A(2.2-2.7)	JC75510-5	Soil	10/8/2018		X	X	X
	SW-D7A(4.0-4.5)	JC75510-6	Soil	10/8/2018		X	X	X
	SW-D7A(6.0-6.5)	JC75510-7	Soil	10/8/2018		X	X	X
	SW-D7A(8.0-8.5)	JC75510-8	Soil	10/8/2018		X	X	X
	BS-F29	JC75510-9	Soil	10/8/2018			X	

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Metals analysis for sample SW-D5 (10.0-10.5) A includes vanadium only.
5. Metals analysis for samples FB(20181008), SW-D7A(6.0-6.5), and DUP-6(20181008) also includes SPLP nickel.
6. Miscellaneous parameters for samples SW-D12(2.2-2.7) and SW-D7A(2.2-2.7) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil/SPLP Leachate	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC74360 and JC75269: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC75510: The MS/MSD analysis performed on sample locations DUP-6(20181008) and SW-D7A(6.0-6.5) exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC74360 and JC75269: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC75510: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples DUP-6(20181008) and SW-D7A(6.0-6.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D7A(6.0-6.5) / DUP-6(20181008)	SPLP Nickel	10 U	10 U	AC

Notes:

AC = Acceptable

SPLP nickel was not detected in the parent sample SW-D7A(6.0-6.5) and field duplicate sample DUP-6(20181008).

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC74360 and JC75269: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC75510: The serial dilution performed on samples DUP-6(20181008) and SW-D7A(6.0-6.5) exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC74360: The MS analysis was not performed using a sample from this SDG.

SDG #JC75269: The MS analysis performed on sample location SW-D12(2.2-2.7) in association with the insoluble hexavalent chromium analysis exhibited a recovery within the control limits.

SDGs #JC75269 and JC75510: The MS analysis performed on sample locations SW-D12(2.2-2.7) and SW-D7A(2.2-2.7) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D12(2.2-2.7)	Hexavalent Chromium, Soluble	56.7%	60.4%
SW-D7A(2.2-2.7)	Hexavalent Chromium, Soluble	< 50%	50.5%
	Hexavalent Chromium, Insoluble	66.4%	71.3%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analysis of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

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SDG #JC74360: The PDS analysis was not performed using a sample from this SDG.

SDG #JC75269: The PDS analysis performed on sample location SW-D12(2.2-2.7) exhibited a recovery within the control limits.

SDG #JC75510: The PDS analysis performed on sample location SW-D7A(2.2-2.7) exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
SW-D7A(2.2-2.7)	Hexavalent Chromium	< 85%	99.6%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC74360: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC75269 and JC75510: The laboratory duplicate analysis performed on sample locations SW-D12(2.2-2.7) and SW-D7A(2.2-2.7) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-D12(2.2-2.7) SW-D12(4.0-4.5) SW-D12(6.0-6.5)	SW846 9045D	Analysis: 3 days	Within 24 hours of receipt
SW-D7A(2.2-2.7) SW-D7A(4.0-4.5) SW-D7A(6.0-6.5) SW-D7A(8.0-8.5)		Analysis: 2 days	
FB(20181004)	SM4500H+B	Analysis: 2 days	Within 24 hours of receipt
SW-D12(2.2-2.7) SW-D7A(2.2-2.7)	ASTM D3872-86	Analysis: 15 days	< 24 hours from collection
		Analysis: 11 days	
SW-D12(2.2-2.7) SW-D7A(2.2-2.7)	SM4500S2-A	Analysis: 15 days	7 days from collection
		Analysis: 11 days	
SW-D12(2.2-2.7)	Lloyd Kahn	Analysis: 15 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC74360, JC75269, and JC75510: The laboratory duplicate analysis performed on sample locations FB (20180901), SW-D12(2.2-2.7), FB(20181004), and SW-D7A(4.0-4.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 15, 2019

PEER REVIEW: Dennis Capria

DATE: May 21, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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FB

CHAIN OF CUSTODY

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TEL. 732-329-0200 FAX 732-329-3499
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FED-EX Tracking #
SGS Quote #
Bottle Order Control # **15-082418-176**
SGS Job # **JC74360**

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes
Company Name Arco		Project Name PPG Jersey City Site 107				Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Nickel Thallium Vanadium										FWW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 Friends Lane		Street 18 Chapel Ave														
City Newark PA 19440		City Jersey City, NJ														
Project Contact Krista Marabula		Project # NP000772-0001-00008														
Phone # 610.755.7080		Client Purchase Order # 														
Sampler(s) Name(s) Christa C. G. H.		Project Manager Jim McLaughlin														
Lab Sample #	Field ID / Point of Collection	MEOH/DI Val #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NI/CH	HM/3	PS/24	NONE	DI Water	MEOH	EN/ORE	LAB USE ONLY
1	FB(20100921)		9/21/10	1030	CC	FB	4									A26
2	SW-D5 (10.0-10.5)A		9/21/10	1000	CC	SW	1									G28
																D58

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other			
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				Sample inventory is verified upon receipt in the Laboratory					

Relinquished by Sampler 1		Date Time 9/21/10 1313	Received By 1		Date Time 9-21-10 1648	Received By 1	
Relinquished by Sampler 3		Date Time	Received By 3		Date Time	Received By 4	
Relinquished by 5		Date Time	Received By 5		Date Time	Received By	

Custody Seq # **066404** Intact Not intact Preserved where applicable On Ice Cooler Temp.



5.2
5

Report of Analysis

Client Sample ID: FB (20180921)	Date Sampled: 09/21/18
Lab Sample ID: JC74360-1	Date Received: 09/21/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/21/18 21:30	LS	SW846 7196A
Redox Potential Vs H2	536		mv	1	09/24/18 11:37	KS	ASTM D1498-76
pH ^a	5.71		su	1	09/21/18 17:30	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB (20180921) Lab Sample ID: JC74360-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/21/18 Date Received: 09/21/18 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/24/18	09/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/24/18	09/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/24/18	09/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/24/18	09/25/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/24/18	09/25/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45320

(2) Prep QC Batch: MP9280

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20180921)	Date Sampled: 09/21/18
Lab Sample ID: JC74360-1A	Date Received: 09/21/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/21/18 21:30	LS	SW846 7196A
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/25/18 06:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D5 (10.0-10.5) A	Date Sampled: 09/21/18
Lab Sample ID: JC74360-2A	Date Received: 09/21/18
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Vanadium	24.8	6.0	mg/kg	1	09/23/18	09/24/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45318

(2) Prep QC Batch: MP9273

RL = Reporting Limit

SO
FB

E



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/nahusa

FEDEX Tracking # **95-01 2818-27**
SGS Quote # **JC 75 241**

Client / Reporting Information		Project Information												Requested Analysis										Matrix Codes
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)																						DW - Drinking Water
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue																						GW - Ground Water
City State Zip Newtown, PA 18840		City State Jersey City NJ																						WW - Wastewater
Project Contact Krista Mastrosalo		Billing Information (if different from Report to) Company Name																						SW - Surface Water
E-mail		Street Address																						SO - Soil
Phone # 610.755.7080		Client Purchase Order # NPO00770.0001																						SL - Sludge
Samp(er)s Name(s) Cynthia Buchanan		Project # NPO00770.0001																						SED - Sediment
Phone #		City State Zip																						OI - Oil
Project Manager Jim McLaughlin, Jr.		Attention																						LCO - Other Liquid
		Number of preserved bottles																						AIR - Air
		Collection																						SOL - Other Solid
		MEQ/DI Vol #																						WFI - Waste
		Date Time																						FB - Field Blank
		Sampled By																						EB - Equipment Blank
		Cont. ID																						RS - Rinse Blank
		Matrix																						TB - Trip Blank
		# of bottles																						
		PC																						
		NPK																						
		Pb																						
		Cu																						
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Report of Analysis

Client Sample ID: FB(20181004)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-1		Date Received: 10/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/04/18 21:35	LS	SW846 7196A
Redox Potential Vs H2	530		mv	1	10/05/18 22:23	JO	ASTM D1498-76
pH ^a	5.22		su	1	10/04/18 18:22	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D12(2.2-2.7)	Date Sampled: 10/04/18
Lab Sample ID: JC75269-2	Date Received: 10/04/18
Matrix: SO - Soil	Percent Solids: 90.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88 J-	0.44	mg/kg	1	10/08/18 16:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	259		mv	1	10/07/18 13:50	RB	ASTM D1498-76M
Solids, Percent	90		%	1	10/08/18 09:18	RI	SM2540 G 18TH ED MOD
pH	7.75 J		su	1	10/07/18 13:10	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D12(4.0-4.5)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-3		Date Received: 10/04/18
Matrix: SO - Soil		Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.46	mg/kg	1	10/08/18 16:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	232		mv	1	10/07/18 14:04	RB	ASTM D1498-76M
Solids, Percent	87.9		%	1	10/08/18 09:18	RI	SM2540 G 18TH ED MOD
pH	7.60 J		su	1	10/07/18 14:00	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D12 (6.0-6.5)	Date Sampled: 10/04/18
Lab Sample ID: JC75269-4	Date Received: 10/04/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.46	mg/kg	1	10/08/18 16:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	282		mv	1	10/07/18 14:30	RB	ASTM D1498-76M
Solids, Percent	86.3		%	1	10/08/18 09:18	RI	SM2540 G 18TH ED MOD
pH	7.74 J		su	1	10/07/18 14:20	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D12(2.2-2.7)	Date Sampled: 10/04/18
Lab Sample ID: JC75269-2R	Date Received: 10/04/18
Matrix: SO - Soil	Percent Solids: 90.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	10/11/18 16:11	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D12(2.2-2.7) Lab Sample ID: JC75269-2RT Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/04/18 Date Received: 10/04/18 Percent Solids: 90.0
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.86 J	0.20	%	1	10/19/18 11:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE R			1	10/19/18 11:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	29000 J	110	mg/kg	1	10/19/18 22:28	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D12(4.0-4.5)	Date Sampled: 10/04/18
Lab Sample ID: JC75269-3R	Date Received: 10/04/18
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	10/11/18 16:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D12 (6.0-6.5)	Date Sampled: 10/04/18
Lab Sample ID: JC75269-4R	Date Received: 10/04/18
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88	0.46	mg/kg	1	10/11/18 16:25	DC	SW846-3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20181004)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-1A		Date Received: 10/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/05/18	10/05/18 PP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/05/18	10/05/18 PP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/05/18	10/05/18 PP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/05/18	10/05/18 PP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/05/18	10/05/18 PP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45403

(2) Prep QC Batch: MP9484

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181004)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-1A		Date Received: 10/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/05/18 20:04	PP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D12(2.2-2.7) Lab Sample ID: JC75269-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/04/18 Date Received: 10/04/18 Percent Solids: 90.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	24.5	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	20.7	4.4	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	27.5	5.6	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45410

(2) Prep QC Batch: MP9496

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D12(2.2-2.7)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-2A		Date Received: 10/04/18
Matrix: SO - Soil		Percent Solids: 90.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.6	1.5	mg/kg	1	10/08/18 16:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D12(4.0-4.5)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-3A		Date Received: 10/04/18
Matrix: SO - Soil		Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	33.7	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	60.1	4.5	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	35.2	5.6	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45410

(2) Prep QC Batch: MP9496

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D12(4.0-4.5)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-3A		Date Received: 10/04/18
Matrix: SO - Soil		Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.6	1.6	mg/kg	1	10/08/18 16:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D12 (6.0-6.5) Lab Sample ID: JC75269-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/04/18 Date Received: 10/04/18 Percent Solids: 86.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	21.3	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	136	4.5	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	24.4	5.6	mg/kg	1	10/05/18	10/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45410

(2) Prep QC Batch: MP9496

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D12 (6.0-6.5)		Date Sampled: 10/04/18
Lab Sample ID: JC75269-4A		Date Received: 10/04/18
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.2	1.6	mg/kg	1	10/08/18 16:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08610
TEL: 732-329-0200 FAX: 732-329-3499/3490
www.sgs.com/ehsusa

SO
FB

E

Client/Reporting Information, Project Information, Requested Analytes, Matrix Codes, Collection table, Turn Around Time, Deliverable, and Chain of Custody sections.

5.2
5

INITIAL ASSESSMENT [Signature]
LABEL VERIFICATION [Signature]

I 6 3.20



Report of Analysis

Client Sample ID: FB(20181004)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-1		Date Received: 10/08/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/08/18 22:12	LS	SW846 7196A
Redox Potential Vs H2	449		mv	1	10/10/18 09:34	RB	ASTM D1498-76
pH ^a	5.46 J		su	1	10/10/18 09:23	RB	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D7A(2.2-2.7)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-5	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.46	mg/kg	1	10/09/18 15:35	LS	SW846 3060A/7196A
Redox Potential Vs H2	377		mv	1	10/10/18 11:41	RB	ASTM D1498-76M
Solids, Percent	86.9		%	1	10/09/18 09:41	RI	SM2540 G 18TH ED MOD
pH	7.40 J		su	1	10/10/18 11:40	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7A(4.0-4.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-6	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50 J-	0.46	mg/kg	1	10/09/18 15:47	LS	SW846 3060A/7196A
Redox Potential Vs H2	427		mv	1	10/10/18 11:52	RB	ASTM D1498-76M
Solids, Percent	86.9		%	1	10/09/18 09:41	RI	SM2540 G 18TH ED MOD
pH	7.47 J		su	1	10/10/18 11:43	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-7	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	10/09/18 15:47	LS	SW846 3060A/7196A
Redox Potential Vs H2	372		mv	1	10/10/18 11:55	RB	ASTM D1498-76M
Solids, Percent	86.4		%	1	10/09/18 09:41	RI	SM2540 G 18TH ED MOD
pH	7.59 J		su	1	10/10/18 11:50	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7A(8.0-8.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-8	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	10/09/18 15:47	LS	SW846 3060A/7196A
Redox Potential Vs H2	349		mv	1	10/10/18 11:58	RB	ASTM D1498-76M
Solids, Percent	86.5		%	1	10/09/18 09:41	RI	SM2540 G 18TH ED MOD
pH	8.11 J		su	1	10/10/18 11:52	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7A(2.2-2.7)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-5R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	10/12/18 18:20	LS	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D7A(2.2-2.7) Lab Sample ID: JC75510-5RT Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/08/18 Date Received: 10/08/18 Percent Solids: 86.9
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.7 J	0.20	%	1	10/19/18 11:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	10/19/18 11:00	MP	SM4500S2- A-11
Total Organic Carbon	96800	120	mg/kg	1	10/19/18 22:52	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7A(4.0-4.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-6R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	10/12/18 18:24	LS	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-7R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	10/12/18 18:24	LS	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7A(8.0-8.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-8R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.46	mg/kg	1	10/12/18 18:24	LS	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F29	Date Sampled: 10/08/18
Lab Sample ID: JC75510-9R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.7	0.46	mg/kg	1	10/12/18 18:24	LS	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FB(20181008)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-1A		Date Received: 10/08/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9569

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181008)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-1A		Date Received: 10/08/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/09/18 20:03	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181008)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-1B	Date Received: 10/08/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	< 10		10	ug/l	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9589

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

4.2
4

Report of Analysis

Client Sample ID: FB(20181008)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-1B	Date Received: 10/08/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.49		su	1	10/10/18	BM	SW846 1312
Volume, SPLP Leachate	N/A		l	1	10/10/18	BM	SW846 1312
Weight, SPLP Leachate	N/A		kg	1	10/10/18	BM	SW846 1312
Dry Weight, SPLP Leachate	N/A		kg	1	10/10/18	BM	SW846 1312

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D7A(2.2-2.7)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-5A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	29.8	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	32.0	4.5	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	51.6	5.6	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9570

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7A(2.2-2.7)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-5A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.7	1.6	mg/kg	1	10/09/18 16:40	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D7A(4.0-4.5)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-6A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.5	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	31.1	4.4	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.9	5.5	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9570

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7A(4.0-4.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-6A	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.0	1.6	mg/kg	1	10/09/18 16:51	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5) Lab Sample ID: JC75510-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/08/18 Date Received: 10/08/18 Percent Solids: 86.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	23.8	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	63.9	4.4	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.7	5.5	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9570

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-7A	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.8	1.6	mg/kg	1	10/09/18 16:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-7AR	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	< 10		10	ug/l	1	10/13/18	10/17/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45466

(2) Prep QC Batch: MP9651

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

Report of Analysis

Client Sample ID: SW-D7A(6.0-6.5)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-7AR	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 86.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.88		su	1	10/13/18 10:15	BM	SW846 1312
Volume, SPLP Leachate	2.001		l	1	10/13/18 10:15	BM	SW846 1312
Weight, SPLP Leachate	0.1001		kg	1	10/13/18 10:15	BM	SW846 1312
Dry Weight, SPLP Leachate	0.08645		kg	1	10/13/18 10:15	BM	SW846 1312

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D7A(8.0-8.5)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-8A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.3	1.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	63.9	4.7	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	5.8	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9570

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D7A(8.0-8.5)		Date Sampled: 10/08/18
Lab Sample ID: JC75510-8A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.3	1.7	mg/kg	1	10/09/18 16:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F29		Date Sampled: 10/08/18
Lab Sample ID: JC75510-9A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	43.8	1.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	49.7	4.8	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.8	6.0	mg/kg	1	10/09/18	10/09/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45429

(2) Prep QC Batch: MP9570

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-F29		Date Sampled: 10/08/18
Lab Sample ID: JC75510-9A		Date Received: 10/08/18
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.8
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	41.4	1.7	mg/kg	1	10/09/18 17:03	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-6(20181008)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-4R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	< 10		10	ug/l	1	11/08/18	11/09/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45628

(2) Prep QC Batch: MP10338

RL = Reporting Limit
MCL = Maximum Contamination Level (not available)

Report of Analysis

Client Sample ID: DUP-6(20181008)	Date Sampled: 10/08/18
Lab Sample ID: JC75510-4R	Date Received: 10/08/18
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	11.04		su	1	11/08/18 09:10	TM	SW846 1312
Volume, SPLP Leachate	2.004		l	1	11/08/18 09:10	TM	SW846 1312
Weight, SPLP Leachate	0.1002		kg	1	11/08/18 09:10	TM	SW846 1312
Dry Weight, SPLP Leachate	0.08264		kg	1	11/08/18 09:10	TM	SW846 1312
Solids, Percent	82.5		%	1	11/08/18 08:41	RC	SM2540 G 18TH ED MOD

RL = Reporting Limit

4.1
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC76242

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32751R

Review Level: Tier III

Project: NP000770.0002.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC76242 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20181016)	JC76242-1	Water	10/19/2018		X	X	X
BS-G14	JC76242-2	Soil	10/19/2018		X	X	X
BS-G15	JC76242-3	Soil	10/19/2018		X	X	X
BS-G16	JC76242-4	Soil	10/19/2018		X	X	X
BS-G13	JC76242-5	Soil	10/19/2018		X	X	X
BS-H13	JC76242-6	Soil	10/19/2018		X	X	X
DUP-17(20181019)	JC76242-7	Soil	10/19/2018	BS-G15	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; Lloyd Kahn; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location BS-G14 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-G15	Antimony	59.3%	61.2%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-G14. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G15 / DUP-17(20181019)	Chromium	17.1	56.9	108%
	Nickel	12.9	22.5	AC
	Vanadium	18.5	31.4	AC
	Trivalent Chromium	15.2	56.4	115%

Notes:

AC = Acceptable

The chromium and trivalent chromium results associated with sample locations BS-G15 and DUP-17(20181019) exhibited field duplicate RPDs greater than the control limit. The associated sample results were qualified as estimated.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location BS-G14 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location BS-G14 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-G14	Hexavalent Chromium, Insoluble	64.2%	66.2%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location BS-G14 exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-G14	Hexavalent Chromium	< 85%	< 85%

DATA REVIEW REPORT

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location BS-G14 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G15 / DUP-17(20181019)	Hexavalent Chromium	1.9	0.55 U	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample BS-G15 and field duplicate sample DUP-17(20181019) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-G14 BS-G15 BS-G16 BS-G13 BS-H13 DUP-17(20181019)	SW846 9045D	Analysis: 4 days	< 24 hours of receipt

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

DATA REVIEW REPORT

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location BS-G14 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G15 / DUP-17(20181019)	Redox Potential	239	220	8.3%
	pH	6.98	7.04	0.9%

The differences in the results between the parent sample BS-G15 and field duplicate sample DUP-17(20181019) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential and pH were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 15, 2019

PEER REVIEW: Dennis Capria

DATE: May 21, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



SGS

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Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes																																																																																																																																																						
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Field ID / Point of Collection FB(20181016)		MECHID Val #		<table border="1"> <tr> <th>Sample #</th> <th>Date</th> <th>Time</th> <th>Sampled by</th> <th>Q.C. #</th> <th>Matrix</th> <th># of bottles</th> <th>ED</th> <th>MCH</th> <th>HC</th> <th>US-SD</th> <th>US-SO</th> <th>US-SL</th> <th>US-WP</th> <th>US-ED</th> <th>US-SC</th> <th>US-LIQ</th> <th>US-AIR</th> </tr> <tr> <td>1</td> <td>10/19/18</td> <td>0845</td> <td>CC</td> <td>G</td> <td>FB</td> <td>4</td> <td></td> <td></td> <td></td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>10/19/18</td> <td>0900</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>10/19/18</td> <td>0900</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>10/19/18</td> <td>0915</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>10/19/18</td> <td>0925</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>10/19/18</td> <td>0935</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>10/19/18</td> <td>0945</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												Sample #	Date	Time	Sampled by	Q.C. #	Matrix	# of bottles	ED	MCH	HC	US-SD	US-SO	US-SL	US-WP	US-ED	US-SC	US-LIQ	US-AIR	1	10/19/18	0845	CC	G	FB	4				2	2								2	10/19/18	0900	CC	G	SO	1													3	10/19/18	0900	CC	G	SO	1													4	10/19/18	0915	CC	G	SO	1													5	10/19/18	0925	CC	G	SO	1													6	10/19/18	0935	CC	G	SO	1													7	10/19/18	0945	CC	G	SO	1												
Sample #	Date	Time	Sampled by	Q.C. #	Matrix	# of bottles	ED	MCH	HC	US-SD	US-SO	US-SL	US-WP	US-ED	US-SC	US-LIQ	US-AIR																																																																																																																																																					
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5.2
5

02.8 SEP

PPG Site 107_Electronic COCs (002)



Report of Analysis

Client Sample ID: FB(20181016)	Date Sampled: 10/19/18
Lab Sample ID: JC76242-1	Date Received: 10/19/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/19/18 20:20	LS	SW846 7196A
Redox Potential Vs H2	392		mv	1	10/22/18 19:01	JO	ASTM D1498-76
pH ^a	4.93		su	1	10/19/18 17:35	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G14	Date Sampled: 10/19/18
Lab Sample ID: JC76242-2	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.50	mg/kg	1	10/23/18 14:55	DC	SW846 3060A/7196A
Redox Potential Vs H2	176		mv	1	10/23/18 16:22	RB	ASTM D1498-76M
Solids, Percent	80.4		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	6.70 J		su	1	10/23/18 15:58	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G15	Date Sampled: 10/19/18
Lab Sample ID: JC76242-3	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9 J-	0.55	mg/kg	1	10/23/18 15:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	239		mv	1	10/23/18 16:23	RB	ASTM D1498-76M
Solids, Percent	72.8		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	6.98 J		su	1	10/23/18 16:10	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G16	Date Sampled: 10/19/18
Lab Sample ID: JC76242-4	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	45.6 J-	0.50	mg/kg	1	10/23/18 15:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	10/23/18 16:25	RB	ASTM D1498-76M
Solids, Percent	79.3		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	7.29 J		su	1	10/23/18 16:15	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G13	Date Sampled: 10/19/18
Lab Sample ID: JC76242-5	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74 J-	0.43	mg/kg	1	10/23/18 15:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	240		mv	1	10/23/18 16:26	RB	ASTM D1498-76M
Solids, Percent	92.7		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	7.63 J		su	1	10/23/18 16:19	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H13	Date Sampled: 10/19/18
Lab Sample ID: JC76242-6	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.45	mg/kg	1	10/23/18 15:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	218		mv	1	10/23/18 16:28	RB	ASTM D1498-76M
Solids, Percent	89.2		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	8.23 J		su	1	10/23/18 16:22	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-17(20181019)		Date Sampled: 10/19/18
Lab Sample ID: JC76242-7		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	10/23/18 15:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	220		mv	1	10/23/18 16:29	RB	ASTM D1498-76M
Solids, Percent	72.2		%	1	10/20/18 10:25	LV	SM2540 G 18TH ED MOD
pH	7.04 J		su	1	10/23/18 16:26	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-G14	Date Sampled: 10/19/18
Lab Sample ID: JC76242-2R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.50	mg/kg	1	10/29/18 18:08	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G15	Date Sampled: 10/19/18
Lab Sample ID: JC76242-3R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85	0.55	mg/kg	1	10/29/18 19:17	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G16	Date Sampled: 10/19/18
Lab Sample ID: JC76242-4R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	129	2.5	mg/kg	5	10/29/18 19:17	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G13	Date Sampled: 10/19/18
Lab Sample ID: JC76242-5R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.43	mg/kg	1	10/29/18 19:17	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H13	Date Sampled: 10/19/18
Lab Sample ID: JC76242-6R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8	0.45	mg/kg	1	10/29/18 19:17	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-17(20181019)	Date Sampled: 10/19/18
Lab Sample ID: JC76242-7R	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79	0.55	mg/kg	1	10/29/18 19:17	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20181016)		Date Sampled: 10/19/18
Lab Sample ID: JC76242-1A		Date Received: 10/19/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/22/18	10/22/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/22/18	10/22/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/22/18	10/22/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/22/18	10/22/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/22/18	10/22/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9770

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181016)	Date Sampled: 10/19/18
Lab Sample ID: JC76242-1A	Date Received: 10/19/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/22/18 21:10	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G14		Date Sampled: 10/19/18
Lab Sample ID: JC76242-2A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.9	1.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.9	5.0	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.5	6.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9774

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G14		Date Sampled: 10/19/18
Lab Sample ID: JC76242-2A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.7	1.7	mg/kg	1	10/23/18 14:55	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G15		Date Sampled: 10/19/18
Lab Sample ID: JC76242-3A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.1 J	1.3	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.9	5.3	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.5	6.7	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9774

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G15	Date Sampled: 10/19/18
Lab Sample ID: JC76242-3A	Date Received: 10/19/18
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.2 J	1.9	mg/kg	1	10/23/18 15:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G16		Date Sampled: 10/19/18
Lab Sample ID: JC76242-4A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	547	1.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	30.5	4.9	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.2	6.2	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9774

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G16		Date Sampled: 10/19/18
Lab Sample ID: JC76242-4A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 79.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	501	1.7	mg/kg	1	10/23/18 15:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G13		Date Sampled: 10/19/18
Lab Sample ID: JC76242-5A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	26.0 J-	2.1	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	51.7	1.0	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ²	SW846 3050B ³
Nickel	33.8	4.2	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium	23.1	5.2	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA45504
- (2) Instrument QC Batch: MA45508
- (3) Prep QC Batch: MP9774

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-G13		Date Sampled: 10/19/18
Lab Sample ID: JC76242-5A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	51.0	1.4	mg/kg	1	10/23/18 15:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H13		Date Sampled: 10/19/18
Lab Sample ID: JC76242-6A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.8 J-	2.3	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.5	1.1	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.4	4.6	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.0	5.7	mg/kg	1	10/22/18	10/23/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9774

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-H13		Date Sampled: 10/19/18
Lab Sample ID: JC76242-6A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.2	1.6	mg/kg	1	10/23/18 15:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-17(20181019)		Date Sampled: 10/19/18
Lab Sample ID: JC76242-7A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	56.9 J	1.4	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	22.5	5.4	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.4	6.8	mg/kg	1	10/22/18	10/23/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45504

(2) Prep QC Batch: MP9774

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-17(20181019)		Date Sampled: 10/19/18
Lab Sample ID: JC76242-7A		Date Received: 10/19/18
Matrix: SO - Soil		Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	56.4 J	2.0	mg/kg	1	10/23/18 15:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC76814, JC76957, JC77370, and JC77451

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32752R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC76814, JC76957, JC77370, and JC77451 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC76814	FB(20181029)	JC76814-1	Water	10/29/2018		X	X	X
	BS-G13D	JC76814-2	Soil	10/29/2018		X	X	X
	BS-H13D	JC76814-3	Soil	10/29/2018		X	X	X
	BS-H13S	JC76814-4	Soil	10/29/2018		X	X	X
	BS-G13S	JC76814-5	Soil	10/29/2018		X	X	X
	DUP-18(20181029)	JC76814-6	Soil	10/29/2018	BS-G13S	X	X	X
JC76957	FB(20181031)	JC76957-1	Water	10/31/2018		X	X	X
	BS-H14S	JC76957-2	Soil	10/31/2018		X	X	X
	BS-G14S	JC76957-3	Soil	10/31/2018		X	X	X
	BS-H14	JC76957-4	Soil	10/31/2018		X	X	X
JC77370	FB(20181106)	JC77370-1	Water	11/6/2018		X	X	X
	BS-G16A	JC77370-2	Soil	11/6/2018		X	X	X
	BS-D16A	JC77370-3	Soil	11/6/2018		X	X	X
	BS-E16A	JC77370-4	Soil	11/6/2018		X	X	X
JC77451	FB(20181107)	JC77451-1	Water	11/7/2018		X	X	X
	BS-I11	JC77451-2	Soil	11/7/2018		X	X	X
	BS-I12	JC77451-3	Soil	11/7/2018		X	X	X
	BS-H15	JC77451-4	Soil	11/7/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC76957, JC77370, and JC77451: Miscellaneous parameters for samples BS-H14S, BS-G14S, BS-E16A, and BS-I11 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC76814, JC76957, and JC77451: The MS/MSD analysis performed on sample locations BS-H13S, BS-H14, and BS-I11 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H13S	Antimony	60.0%	59.5%
BS-H14	Antimony	72.9%	AC (79.8%)
	Chromium	AC (104.2%)	> 125%
BS-I11	Antimony	57.7%	62.0%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

SDG #JC77370: The MS/MSD analysis was not performed using a sample from this SDG.

DATA REVIEW REPORT

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC76814, JC76957, and JC77451: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-H13S, BS-H14, and BS-I11. The MS/MSD recoveries exhibited acceptable RPDs.

SDG #JC77370: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G13S / DUP-18(20181029)	Chromium	14.9	13.5	9.9%
	Trivalent Chromium	14.4	12.5	14.1%
	Nickel	11.6	11.3	AC
	Vanadium	20.1	17.9	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-G13S and field duplicate sample DUP-18(20181029) were acceptable.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample

DATA REVIEW REPORT

are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC76814, JC76957, and JC77451: The serial dilution performed on sample locations BS-H13S, BS-H14, and BS-I11 exhibited %D within control limits.

SDG #JC77370: The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC76814: The MS analysis performed on sample location BS-H13S in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC77451: The MS analysis performed on sample location BS-I11 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC76957, JC77370, and JC77451: The MS analysis performed on sample locations BS-G14S, BS-E16A, and BS-I11 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-G14S	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	AC (91.8%)	< 50%
BS-E16A	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	AC (77.6%)	57.6%
BS-I11	Hexavalent Chromium, Soluble	< 50%	51.1%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC76957, JC77370, and JC77451: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC76814, JC76957, and JC77451: The PDS analysis performed on sample locations BS-H13S, BS-G14S, and BS-I11 exhibited recoveries within the control limits.

SDG #JC77370: The PDS analysis performed on sample location BS-E16A exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-E16A	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC76814, JC76957, JC77370, and JC77451: The laboratory duplicate analysis performed on sample locations BS-H13S, BS-G14S, BS-E16A, and BS-I11 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G13S / DUP-18(20181029)	Hexavalent Chromium	0.48	1.0	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample BS-G13S and field duplicate sample DUP-18(20181029) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-I11 BS-I12 BS-H15	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-G16A BS-D16A BS-E16A		Analysis: 3 days	
BS-H14S BS-G14S		Analysis: 8 days	
BS-I11 BS-E16A	ASTM D3872-86	Analysis: 9 days	< 24 hours from collection
		Analysis: 10 days	
BS-H14S BS-G14S BS-I11 BS-E16A	SM4500S2-A	Analysis: 8 days	7 days from collection
		Analysis: 9 days	
		Analysis: 10 days	

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC76814, JC77370, and JC77451: The laboratory duplicate analysis performed on sample locations BS-H13S, BS-E16A, and BS-I11 exhibited results within the control limit.

SDG #JC76957: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G13S / DUP-18(20181029)	Redox Potential	367	373	1.6%
	pH	6.65	6.72	1.0%

The differences in the results between the parent sample BS-G13S and field duplicate sample DUP-18(20181029) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 15, 2019

PEER REVIEW: Dennis Capria

DATE: May 21, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



FED-EX Tracking #
SGS Order #
Bottle Order Control # **25-092818-43**
SGS Job # **3C76814**

Client / Reporting Information				Project Information				Requested Analysis												Matrix Codes				
Company Name: Arcadis				Project Name: PPG Site 107 (Jersey City)																Matrix Codes <small>GW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquids AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank</small>				
Street Address: 10 Friends Lane, Suite 200 Newtown, PA 18440				Street: 18 Chapel Avenue Jersey City NJ																				
City: Newtown, PA State: PA Zip: 18440				Billing Information (if different from Report to): Company Name:																				
Project Contact: Krista Mastrocola				Project #: NPO00770.0001																				
Phone #: 610.755.7080				Client Purchase Order #:																				
Samplers Name(s): Cynthia Buchanan				Project Manager: Jim McLaughlin, Jr.																				
SGS Serial #	Field ID / Point of Collection	METHOD / Vol #	Date	Time	Sampled by	Matrix	# of bottles	MCP	Number of preserved Bottles								Total Chromium	Hexavalent Chromium	Trihalogen Chromium	Amines	Nestle	Thallium	Vanadium	LAB USE ONLY
									NYAS	EDS	EDS	EDS	EDS	EDS	EDS	EDS								
1	FB(20181029)		10/29/18	1030	CB	FB	4		2	2						X	X	X	X	X	X			
2	BS-G13D		10/29/18	1300	CB	G	SO	1							X	X	X	X	X	X	X			
3	BS-H13D		10/29/18	1310	CB	G	SO	1							X	X	X	X	X	X	X	A22		
4	BS-H13S		10/29/18	1330	CB	G	SO	1							X	X	X	X	X	X	X	M12		
5	BS-G13S		10/29/18	1320	CB	G	SO	1							X	X	X	X	X	X	X			
4	BS-H13S-MS		10/29/18	1330	CB	G	SO	1							X	X	X	X	X	X	X	D21		
6	DUP(20181029)		10/29/18	1330	CB	G	SO	1							X	X	X	X	X	X	X			

Turn Around Time (Business Days)		Deliverable				Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>At data available via Lablink</small>		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DWQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equile <input type="checkbox"/> DOD-OBMS				Approved needed for 1-3 Business Day TAT <small>Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data</small>	

Sample Custody must be documented below each time samples change possession, including courier delivery.

Requested By: <i>[Signature]</i>	Date / Time: 10-29-18 11:00	Received By: <i>[Signature]</i>	Date / Time: 10-29-18
Requested By: <i>[Signature]</i>	Date / Time: 10-29-18	Received By: <i>[Signature]</i>	Date / Time: 10-29-18
Requested By: <i>[Signature]</i>	Date / Time: 10-29-18	Received By: <i>[Signature]</i>	Date / Time: 10-29-18

Custody Seal # 79634 Intact Not intact | Preserved where applicable Absent | Therm. ID: **IP 330C**

INITIAL ASSESSMENT **3B/AP**
LABEL VERIFICATION _____

5.2
5

Report of Analysis

Client Sample ID: FB(20181029)	Date Sampled: 10/29/18
Lab Sample ID: JC76814-1	Date Received: 10/29/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	10/29/18 21:35	LS	SW846 7196A
Redox Potential Vs H2	326		mv	1	10/30/18 15:43	RB	ASTM D1498-76
pH ^a	6.16		su	1	10/29/18 16:42	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G13D	Date Sampled: 10/29/18
Lab Sample ID: JC76814-2	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.65	0.50	mg/kg	1	10/30/18 21:35	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	10/30/18 15:09	RB	ASTM D1498-76M
Solids, Percent	80.8		%	1	10/30/18 12:50	BG	SM2540 G 18TH ED MOD
pH	8.27		su	1	10/30/18 14:45	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H13D	Date Sampled: 10/29/18
Lab Sample ID: JC76814-3	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.54	mg/kg	1	10/30/18 21:35	DC	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	10/30/18 15:10	RB	ASTM D1498-76M
Solids, Percent	74.5		%	1	10/30/18 12:50	BG	SM2540 G 18TH ED MOD
pH	7.29		su	1	10/30/18 14:54	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H13S	Date Sampled: 10/29/18
Lab Sample ID: JC76814-4	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.46	mg/kg	1	10/30/18 21:30	DC	SW846 3060A/7196A
Redox Potential Vs H2	247		mv	1	10/30/18 15:14	RB	ASTM D1498-76M
Solids, Percent	86.8		%	1	10/30/18 12:50	BG	SM2540 G 18TH ED MOD
pH	8.25		su	1	10/30/18 14:59	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G13S	Date Sampled: 10/29/18
Lab Sample ID: JC76814-5	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.48	0.46	mg/kg	1	10/30/18 21:35	DC	SW846 3060A/7196A
Redox Potential Vs H2	367		mv	1	10/30/18 15:17	RB	ASTM D1498-76M
Solids, Percent	87		%	1	10/30/18 12:50	BG	SM2540 G 18TH ED MOD
pH	6.65		su	1	10/30/18 15:06	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-18(20181029)	Date Sampled: 10/29/18
Lab Sample ID: JC76814-6	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.46	mg/kg	1	10/30/18 21:35	DC	SW846 3060A/7196A
Redox Potential Vs H2	373		mv	1	10/30/18 15:17	RB	ASTM D1498-76M
Solids, Percent	87.3		%	1	10/30/18 12:50	BG	SM2540 G 18TH ED MOD
pH	6.72		su	1	10/30/18 15:11	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20181029)		Date Sampled: 10/29/18
Lab Sample ID: JC76814-1A		Date Received: 10/29/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9990

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181029)	Date Sampled: 10/29/18
Lab Sample ID: JC76814-1A	Date Received: 10/29/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	10/31/18 03:09	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G13D		Date Sampled: 10/29/18
Lab Sample ID: JC76814-2A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.1	1.2	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.0	4.9	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	37.2	6.1	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9989

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G13D		Date Sampled: 10/29/18
Lab Sample ID: JC76814-2A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.5	1.7	mg/kg	1	10/30/18 23:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H13D		Date Sampled: 10/29/18
Lab Sample ID: JC76814-3A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	13.9 J-	2.8	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	60.9	1.4	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	422	5.6	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.8	2.8	mg/kg	2	10/30/18	10/31/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	40.1	7.0	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9989

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H13D		Date Sampled: 10/29/18
Lab Sample ID: JC76814-3A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	59.2	1.9	mg/kg	1	10/30/18 23:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H13S	Date Sampled: 10/29/18
Lab Sample ID: JC76814-4A	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.1	1.2	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.1	4.9	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	6.1	mg/kg	1	10/30/18	10/30/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9989

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H13S		Date Sampled: 10/29/18
Lab Sample ID: JC76814-4A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.5	1.7	mg/kg	1	10/30/18 22:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G13S Lab Sample ID: JC76814-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/29/18 Date Received: 10/29/18 Percent Solids: 87.0
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.9	1.1	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.6	4.6	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.1	5.7	mg/kg	1	10/30/18	10/30/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9989

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-G13S		Date Sampled: 10/29/18
Lab Sample ID: JC76814-5A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.4	1.6	mg/kg	1	10/30/18 23:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP(20181029)		Date Sampled: 10/29/18
Lab Sample ID: JC76814-6A		Date Received: 10/29/18
Matrix: SO - Soil		Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	10/30/18	10/31/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.5	1.1	mg/kg	1	10/30/18	10/31/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	4.4	mg/kg	1	10/30/18	10/31/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	10/30/18	10/31/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	17.9	5.6	mg/kg	1	10/30/18	10/31/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45554

(2) Prep QC Batch: MP9989

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP(20181029)	Date Sampled: 10/29/18
Lab Sample ID: JC76814-6A	Date Received: 10/29/18
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	1.6	mg/kg	1	10/31/18 00:01	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC76957

Client / Reporting Information			Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Cod								
Company Name Acadus			Project Name: PPG Site 107 Jersey City														DW - Drinking W GW - Ground W WW - Wata SW - Surface W SO - Soil SL - Sludge SED - Sedime OI - Oil LIQ - Other Lic AIR - Air SOL - Other S WP - Wipe FB-Equipment B EB-Rinse Bla TB-Trip Blat								
Street Address 10 Friends Lane, Suite 200			Street 18 Chapel Avenue																						
City New Haven, PA 18440			City Jersey City, NJ																						
Project Contact Krista Marzucola			Project # NP000770.0001.00008																						
Phone # 610.755.7080			Client Purchase Order #																						
Sampler(s) Name(s) Christina C.elli			Project Manager Jim McLaughlin, Jr.																						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection			Matrix	# of bottles	Number of preserved bottles										LAB USE ON							
			Date	Time	Sampled by			HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	H ₂ O ₂	DI Water	MEOH	ENCORE	Total Chromium	Hexavalent Chromium		Trivalent Chromium	Arsenic	Nickel	Thallium	Vanadium		
1	FB(20181031)		10/31/18	1330	CC	FB	4																		A30
2	BS-H14S		10/31/18	1200	CC	SO	1																		C9
3	BS-G14S		10/31/18	1150	CC	SO	1																		B17
4	BS-H14		10/31/18	1210	CC	SO	1																		

5.2
5

Turnaround Time (Business days)			Data Deliverable Information										Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other			Approved by (SGS Project Manager)/Date:			<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQU <input type="checkbox"/> Other					INITIAL ASSESSMENT SAR LABEL VERIFICATION

Emergency & Rush TIA data available via LabLink												Sample inventory is verified upon receipt in the Laboratory											
Sample Custody must be documented below each time samples change possession, including courier delivery.																							
Relinquished by Sampler: Jelli			Date Time: 10/31/18 1430			Received By: Robert Schaubus			Date Time: 10/31/18 1541			Received By: [Signature]											
Relinquished by Sampler:			Date Time:			Received By:			Date Time:			Received By:											
Relinquished by:			Date Time:			Received By:			Date Time:			Received By:											
Custody Seal # 12168						<input type="checkbox"/> Intact <input type="checkbox"/> Not intact						Preserved where applicable On Ice <input checked="" type="checkbox"/> Cooling Temp: 37°C											

Report of Analysis

Client Sample ID: FB(20181031) Lab Sample ID: JC76957-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 10/31/18 Date Received: 10/31/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/01/18 00:15	LS	SW846 7196A
Redox Potential Vs H2	449		mv	1	11/01/18 11:39	RI	ASTM D1498-76
pH ^a	6.03		su	1	10/31/18 15:48	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-2	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.0 J-	0.52	mg/kg	1	11/02/18 13:07	DC	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	11/01/18 12:33	RI	ASTM D1498-76M
Solids, Percent	76.6		%	1	11/01/18 12:00	RC	SM2540 G 18TH ED MOD
pH	6.63		su	1	11/01/18 11:59	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-3	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.52	mg/kg	1	11/02/18 13:06	DC	SW846 3060A/7196A
Redox Potential Vs H2	253		mv	1	11/01/18 12:44	RI	ASTM D1498-76M
Solids, Percent	77.5		%	1	11/01/18 12:00	RC	SM2540 G 18TH ED MOD
pH	7.34		su	1	11/01/18 12:10	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H14	Date Sampled: 10/31/18
Lab Sample ID: JC76957-4	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 J-	0.52	mg/kg	1	11/02/18 13:07	DC	SW846 3060A/7196A
Redox Potential Vs H2	175		mv	1	11/01/18 12:53	RI	ASTM D1498-76M
Solids, Percent	77		%	1	11/01/18 12:00	RC	SM2540 G 18TH ED MOD
pH	6.45		su	1	11/01/18 12:15	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-2R	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	11/06/18 11:35	DC	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-2RT	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.3 J	0.20	%	1	11/08/18 12:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/08/18 12:30	MP	SM4500S2- A-11
Total Organic Carbon	91200	130	mg/kg	1	11/08/18 15:21	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-3R	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.52	mg/kg	1	11/06/18 11:33	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G14S		Date Sampled: 10/31/18
Lab Sample ID: JC76957-3RT		Date Received: 10/31/18
Matrix: SO - Soil		Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.8 J	0.20	%	1	11/08/18 12:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/08/18 12:30	MP	SM4500S2- A-11
Total Organic Carbon	56100	130	mg/kg	1	11/08/18 12:03	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H14	Date Sampled: 10/31/18
Lab Sample ID: JC76957-4R	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.52	mg/kg	1	11/06/18 11:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20181031)		Date Sampled: 10/31/18
Lab Sample ID: JC76957-1A		Date Received: 10/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45568

(2) Prep QC Batch: MP10078

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181031)		Date Sampled: 10/31/18
Lab Sample ID: JC76957-1A		Date Received: 10/31/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/01/18 16:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H14S		Date Sampled: 10/31/18
Lab Sample ID: JC76957-2A		Date Received: 10/31/18
Matrix: SO - Soil		Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	16.9 J-	2.7	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	239 J+	1.3	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	31.9	5.4	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 6.7	6.7	mg/kg	5	11/01/18	11/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.8	6.7	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45568

(2) Prep QC Batch: MP10089

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-2A	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	236	1.8	mg/kg	1	11/02/18 13:07	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G14S	Date Sampled: 10/31/18
Lab Sample ID: JC76957-3A	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 5.1 UJ-	5.1	mg/kg	2	11/01/18	11/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	1340 J+	2.6	mg/kg	2	11/01/18	11/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	112	5.1	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.6	2.6	mg/kg	2	11/01/18	11/02/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	151	13	mg/kg	2	11/01/18	11/02/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45568

(2) Prep QC Batch: MP10089

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G14S		Date Sampled: 10/31/18
Lab Sample ID: JC76957-3A		Date Received: 10/31/18
Matrix: SO - Soil		Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1340	3.1	mg/kg	1	11/02/18 13:06	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H14		Date Sampled: 10/31/18
Lab Sample ID: JC76957-4A		Date Received: 10/31/18
Matrix: SO - Soil		Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	11.6 J-	2.5	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	193 J+	1.3	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	30.2	5.0	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	46.3	6.3	mg/kg	1	11/01/18	11/01/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45568

(2) Prep QC Batch: MP10089

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H14	Date Sampled: 10/31/18
Lab Sample ID: JC76957-4A	Date Received: 10/31/18
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	191	1.8	mg/kg	1	11/02/18 13:07	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

SGS

SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08919
TEL: 732-329-0200 FAX: 732-329-3400/3480
www.sgs.com/en/usa

E
ER

Client / Reporting Information				Project Information				Requested Analysis													Matrix Codes											
Company Name: Arcadis				Project Name: PPG Site 107 (Jersey City)																	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank											
Street Address: 10 Friends Lane, Suite 200				Street: 18 Chapel Avenue																												
City: Newtown, PA State: PA Zip: 18440				City: Jersey City State: NJ Company Name:																												
Project Contact: Krista Mastrocola Email:				Project #: NP000770.0001 Street Address:																												
Phone #: 610.755.7080				Client Purchase Order #:																												
Sample(s) Name(s): C. Citelli				Project Manager: Jim Maloughlin, Jr. Attention:																												
SSG Form #	Field ID / Point of Collection	MEDHOL Vial #	Collection		Sampled by	Use for CAPC/C	Matrix	# of bottles	Number of preserved bottles										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium I	LAB USE ONLY						
			Date	Time					MO	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL									AUG	SEP	OCT	NOV	DEC	
1	FB(20181106)		11/6/18	0800	CC	G	FB	4	2	2	2	1	1										A32									
2	BS-D16A		11/6/18	0930	CC	G	SO	1				1										B23										
3	BS-D16A		11/6/18	1030	CC	G	SO	1				1																				
4	BS-E16A		11/6/18	1345	CC	G	SO	1				1										D37 CRUSH										
Turn Around Time (Business Days)				Deliverable				Comments / Special Instructions																								
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other				Approved by (SGS PM) / Date: _____				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format/Equival				<input type="checkbox"/> DOD-QSMS																
Approval needed for 1-3 Business Day TAT				Commercial "A" = Results only; Commercial "B" = Results + QC Summary				Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions																								
Sample Custody must be documented below each time samples change possession, including courier delivery.																																
1	Requested by:	Date / Time:	Received By:	Date / Time:	Requested by:	Date / Time:	Received By:	Date / Time:	Requested by:	Date / Time:	Received By:	Date / Time:	Requested by:	Date / Time:	Received By:	Date / Time:	Requested by:	Date / Time:	Received By:	Date / Time:	Requested by:	Date / Time:	Received By:									
3																																
5																																
				Custody Seal # 14938				<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact				<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent				<input type="checkbox"/> On Ice <input checked="" type="checkbox"/> Ambient				<input type="checkbox"/> Cooler Temp. °C												

5.2
5

INITIAL ASSESSMENT 3B
LABEL VERIFICATION _____

3.9

CIP

PPG Site 107_Electronic COCs 20181029

Report of Analysis

Client Sample ID: FB(20181106)		Date Sampled: 11/06/18
Lab Sample ID: JC77370-1		Date Received: 11/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/06/18 21:10	LS	SW846 7196A
Redox Potential Vs H2	251		mv	1	11/09/18 16:15	JOO	ASTM D1498-76
pH ^a	6.99		su	1	11/06/18 18:00	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-2		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.5 J-	0.52	mg/kg	1	11/07/18 14:11	DC	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	11/09/18 15:51	JOO	ASTM D1498-76M
Solids, Percent	76.7		%	1	11/07/18 11:22	BG	SM2540 G 18TH ED MOD
pH	7.67 J		su	1	11/09/18 15:51	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D16A	Date Sampled: 11/06/18
Lab Sample ID: JC77370-3	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 J-	0.57	mg/kg	1	11/07/18 14:11	DC	SW846 3060A/7196A
Redox Potential Vs H2	279		mv	1	11/09/18 15:57	JOO	ASTM D1498-76M
Solids, Percent	70		%	1	11/07/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.71 J		su	1	11/09/18 15:57	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E16A	Date Sampled: 11/06/18
Lab Sample ID: JC77370-4	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54 J-	0.54	mg/kg	1	11/07/18 14:06	DC	SW846 3060A/7196A
Redox Potential Vs H2	276		mv	1	11/09/18 15:59	JOO	ASTM D1498-76M
Solids, Percent	74.5		%	1	11/07/18 15:00	SF	SM2540 G 18TH ED MOD
pH	6.61 J		su	1	11/09/18 15:59	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G16A	Date Sampled: 11/06/18
Lab Sample ID: JC77370-2R	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.8	0.52	mg/kg	1	11/12/18 18:41	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D16A	Date Sampled: 11/06/18
Lab Sample ID: JC77370-3R	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.57	mg/kg	1	11/12/18 18:41	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E16A	Date Sampled: 11/06/18
Lab Sample ID: IC77370-4R	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.54	mg/kg	1	11/12/18 18:36	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-4RT		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.5 J	0.20	%	1	11/16/18 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/16/18 12:00	MP	SM4500S2- A-11
Total Organic Carbon	49200	130	mg/kg	1	11/14/18 21:50	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181106)		Date Sampled: 11/06/18
Lab Sample ID: JC77370-1A		Date Received: 11/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/07/18	11/07/18 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/07/18	11/07/18 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/07/18	11/07/18 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/07/18	11/07/18 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/07/18	11/07/18 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45613

(2) Prep QC Batch: MP10233

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181106)	Date Sampled: 11/06/18
Lab Sample ID: JC77370-1A	Date Received: 11/06/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/07/18 21:53	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-2A		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	453	1.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	98.4	5.0	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	20.8	6.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45613

(2) Prep QC Batch: MP10297

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-2A		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	447	1.8	mg/kg	1	11/07/18 19:43	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-3A		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	18.8	1.4	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	23.4	5.7	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	28.5	7.1	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45613

(2) Prep QC Batch: MP10297

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-3A		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 70.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.9	2.0	mg/kg	1	11/07/18 19:49	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E16A		Date Sampled: 11/06/18
Lab Sample ID: JC77370-4A		Date Received: 11/06/18
Matrix: SO - Soil		Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	13.9	1.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	12.2	5.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	21.1	6.6	mg/kg	1	11/07/18	11/07/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45613

(2) Prep QC Batch: MP10297

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E16A	Date Sampled: 11/06/18
Lab Sample ID: JC77370-4A	Date Received: 11/06/18
Matrix: SO - Soil	Percent Solids: 74.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.4	1.8	mg/kg	1	11/07/18 19:54	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



FEDEX Tracking #	Bill of Lading Control #
SGS Quote #	SGS Job #
	JC77451

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes	
Company Name Accadis		Project Name PPG Site 107 (Jersey City)																				DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LO - Other Liquid AIR - Air SOL - Other Solid WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue																					
City State Zip Newtown, PA 18440		City State Jersey City NJ																					
Project Contact Krista Mastrosalo		Billing Information (if different from Report to) Company Name																					
E-mail 610.755.7080		Project # NP000770.0001																					
Phone #		Client Purchase Order #																					
Sample(s) Name(s) C. Cifelli		Project Manager Jim McLaughlin, Jr.																					
		City State Zip																					
		Matrix																					
		Number of preserved bottles																					
		Total Chromium																					
		Hexavalent Chromium																					
		Trivalent Chromium																					
		Antimony																					
		Nickel																					
		Thallium																					
		Vanadium																					
		LAB USE ONLY																					
Field ID / Point of Collection FBI(20181107)		MECH/ID/Val #																					
Date Time 11/7/18 1245		Sampled by CC G FB 4																					
Date Time 11/7/18 1300		Matrix SO 1																					
Date Time 11/7/18 1300		Matrix SO 1																					
Date Time 11/7/18 1325		Matrix SO 1																					
Date Time 11/7/18 1335		Matrix SO 1																					
Date Time 11/7/18 1315		Matrix SO 1																					
Date Time -- --		Matrix SO 1																					
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions											
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DNQP										NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MMSCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equips										<input type="checkbox"/> DOD-QSMS	
<input type="checkbox"/> All data available via Lablink <input type="checkbox"/> Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only; Commercial "B" = Results + OC Summary Commercial "C" = Results + OC Summary + Initial Raw data										http://www.sgs.com/en/terms_and_conditions											
Prepared By: <i>[Signature]</i> Date / Time: 11/7/18 1430		Received By: <i>[Signature]</i> Date / Time: 11/16/18 1711										Received By: <i>[Signature]</i> Date / Time: 11/16/18 1711											
Retransmitted By: <i>[Signature]</i> Date / Time:		Received By: <i>[Signature]</i> Date / Time:										Received By: <i>[Signature]</i> Date / Time:											
Retransmitted By: <i>[Signature]</i> Date / Time:		Received By: <i>[Signature]</i> Date / Time:										Received By: <i>[Signature]</i> Date / Time:											
Safety Seal # 11731		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact										<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Altered										Cooler Temp. °C 3.5	

Initial Assessment 2A (R)
 Label Verification _____

PPG Site 107_Electronic COCs 20181029



5.2
 5

Report of Analysis

Client Sample ID: FB(20181107) Lab Sample ID: JC77451-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/07/18 Date Received: 11/07/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/08/18 10:00	JOO	SW846 7196A
Redox Potential Vs H2	253		mv	1	11/08/18 23:48	JO	ASTM D1498-76
pH ^a	5.31		su	1	11/07/18 18:28	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I11		Date Sampled: 11/07/18
Lab Sample ID: JC77451-2		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54 J-	0.47	mg/kg	1	11/08/18 18:55	DC	SW846 3060A/7196A
Redox Potential Vs H2	268		mv	1	11/09/18 16:00	JOO	ASTM D1498-76M
Solids, Percent	84.4		%	1	11/08/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.07 J		su	1	11/09/18 16:00	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I12		Date Sampled: 11/07/18
Lab Sample ID: JC77451-3		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.51	mg/kg	1	11/08/18 19:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	11/09/18 16:11	JOO	ASTM D1498-76M
Solids, Percent	78.8		%	1	11/08/18 08:41	RC	SM2540 G 18TH ED MOD
pH	6.56 J		su	1	11/09/18 16:11	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H15	Date Sampled: 11/07/18
Lab Sample ID: JC77451-4	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59 J-	0.51	mg/kg	1	11/08/18 19:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	255		mv	1	11/09/18 16:14	JOO	ASTM D1498-76M
Solids, Percent	78		%	1	11/08/18 08:41	RC	SM2540 G 18TH ED MOD
pH	7.05 J		su	1	11/09/18 16:14	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I11	Date Sampled: 11/07/18
Lab Sample ID: JC77451-2R	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.47	mg/kg	1	11/13/18 11:40	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 11/07/18
Lab Sample ID: JC77451-3R	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.70	0.51	mg/kg	1	11/13/18 11:45	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H15	Date Sampled: 11/07/18
Lab Sample ID: JC77451-4R	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	11/13/18 11:45	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I11		Date Sampled: 11/07/18
Lab Sample ID: JC77451-2RT		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.94 J	0.20	%	1	11/16/18 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/16/18 12:00	MP	SM4500S2- A-11
Total Organic Carbon	1290	120	mg/kg	1	11/14/18 18:42	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181107)		Date Sampled: 11/07/18
Lab Sample ID: JC77451-1A		Date Received: 11/07/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45619

(2) Prep QC Batch: MP10320

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181107)	Date Sampled: 11/07/18
Lab Sample ID: JC77451-1A	Date Received: 11/07/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/08/18 22:38	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I11		Date Sampled: 11/07/18
Lab Sample ID: JC77451-2A		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	18.5	1.1	mg/kg	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3050B ³
Nickel	14.8	4.6	mg/kg	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3050B ³
Thallium	< 2.3	2.3	mg/kg	2	11/08/18	11/09/18 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	29.3	5.7	mg/kg	1	11/08/18	11/08/18 GT	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA45619
- (2) Instrument QC Batch: MA45620
- (3) Prep QC Batch: MP10319

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I11		Date Sampled: 11/07/18
Lab Sample ID: JC77451-2A		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.6	mg/kg	1	11/08/18 23:14	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 11/07/18
Lab Sample ID: JC77451-3A	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	11/08/18	11/09/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	14.0	1.3	mg/kg	1	11/08/18	11/09/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	70.1	5.0	mg/kg	1	11/08/18	11/09/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/08/18	11/09/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	6.3	mg/kg	1	11/08/18	11/09/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45619

(2) Prep QC Batch: MP10319

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I12		Date Sampled: 11/07/18
Lab Sample ID: JC77451-3A		Date Received: 11/07/18
Matrix: SO - Soil		Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.4	1.8	mg/kg	1	11/09/18 00:38	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H15	Date Sampled: 11/07/18
Lab Sample ID: JC77451-4A	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	7.1 J-	2.6	mg/kg	1	11/08/18	11/09/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	78.1	1.3	mg/kg	1	11/08/18	11/09/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	17.2	5.2	mg/kg	1	11/08/18	11/09/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/08/18	11/09/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.4	6.5	mg/kg	1	11/08/18	11/09/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45619

(2) Prep QC Batch: MP10319

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H15	Date Sampled: 11/07/18
Lab Sample ID: JC77451-4A	Date Received: 11/07/18
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	77.5	1.8	mg/kg	1	11/09/18 00:41	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC77526, JC77638, and JC78304

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32753R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC77526, JC77638, and JC78304 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC77526	FB(20181010)	JC77526-1	Water	11/8/2018		X	X	X
	BS-F29	JC77526-2	Soil	11/8/2018		X	X	X
	BS-F30	JC77526-3	Soil	11/8/2018		X	X	X
JC77638	FB(20181109)	JC77638-1	Water	11/9/2018		X	X	X
	DUP-19(20181109)	JC77638-2	Soil	11/9/2018	SW-D3(10.0-10.5)A	X	X	X
	SW-D2(0.0-0.5)A	JC77638-3	Soil	11/9/2018		X	X	X
	SW-D2(2.0-2.5)A	JC77638-4	Soil	11/9/2018		X	X	X
	SW-D2(4.0-4.5)A	JC77638-5	Soil	11/9/2018		X	X	X
	SW-D2(6.0-6.5)A	JC77638-6	Soil	11/9/2018		X	X	X
	SW-D2(8.0-8.5)A	JC77638-7	Soil	11/9/2018		X	X	X
	SW-D2(10.0-10.5)A	JC77638-8	Soil	11/9/2018		X	X	X
	SW-D3(0.0-0.5)A	JC77638-9	Soil	11/9/2018		X	X	X
	SW-D3(2.0-2.5)A	JC77638-10	Soil	11/9/2018		X	X	X
	SW-D3(4.0-4.5)A	JC77638-11	Soil	11/9/2018		X	X	X
	SW-D3(6.0-6.5)A	JC77638-12	Soil	11/9/2018		X	X	X
	SW-D3(8.0-8.5)A	JC77638-13	Soil	11/9/2018		X	X	X
	SW-D3(10.0-10.5)A	JC77638-14	Soil	11/9/2018		X	X	X
	BS-G16B	JC77638-15	Soil	11/9/2018		X	X	X
	BS-F16A	JC77638-16	Soil	11/9/2018			X	
	SW-A3(0.0-0.5)A	JC77638-17	Soil	11/9/2018		X	X	X
	SW-A3(2.0-2.5)A	JC77638-18	Soil	11/9/2018		X	X	X
	SW-A3(4.0-4.5)A	JC77638-19	Soil	11/9/2018		X	X	X
JC78304	FB(20181120)	JC78304-1	Water	11/20/2018		X	X	X
	SW-D10-(0.0-0.5)A	JC78304-2	Soil	11/20/2018		X	X	X

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SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
	SW-D10(2.0-2.5)A	JC78304-3	Soil	11/20/2018		X	X	X
	SW-D10(4.0-4.5)A	JC78304-4	Soil	11/20/2018		X	X	X
	SW-D10(6.0-6.5)A	JC78304-5	Soil	11/20/2018		X	X	X
	BS-E30(8.0-8.5)A	JC78304-6	Soil	11/20/2018		X	X	X
	SW-D4(0.0-0.5)A	JC78304-7	Soil	11/20/2018		X	X	X
	SW-D4(2.0-2.5)A	JC78304-8	Soil	11/20/2018		X	X	X
	SW-D4(4.0-4.5)A	JC78304-9	Soil	11/20/2018		X	X	X
	SW-D4(6.0-6.5)A	JC78304-10	Soil	11/20/2018		X	X	X
	SW-D4(8.0-8.5)A	JC78304-11	Soil	11/20/2018		X	X	X
	SW-D4(10.0-10.5)A	JC78304-12	Soil	11/20/2018		X	X	X
	BS-H14A	JC78304-13	Soil	11/20/2018		X	X	X
	BS-G14A	JC78304-14	Soil	11/20/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC77526, JC77638: Miscellaneous parameters for samples BS-F29, SW-D3(6.0-6.5)A also include ferrous iron, sulfide screen, and total organic carbon (TOC).
5. SDG #JC77638: Metals analysis for sample BS-F16A includes only nickel.

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ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

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INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

SDGs #JC77526 and JC78304: All continuing calibration verification standard recoveries were within the control limit.

SDG #JC77638: All continuing calibration verification standard recoveries were within control limits with the exception of the analytes presented in the following table.

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Sample Locations	Initial/Continuing	Analytes	Standard Recovery
SW-A3(4.0-4.5)A	Continuing Calibration Verification	Thallium	111.5%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Analytes	Control Limit	Sample Result	Qualification
All analytes	75% to 89%	Non-detect	UJ
		Detect	J
	111% to 125%	Non-detect	No Action
		Detect	J
	<75%	Non-detect	R
		Detect	J
	>125%	Non-detect	No Action
		Detect	J or R
	>160%	Non-detect	No Action
		Detect	R

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

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SDG #JC77526: The MS/MSD analysis was not performed using a sample from this SDG.

SDGs #JC77638 and JC78304: The MS/MSD analysis performed on sample locations SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10(6.0-6.5)A exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D3(6.0-6.5)A	Antimony	63.8%	66.6%
SW-A3(4.0-4.5)A	Antimony	70.8%	74.4%
	Chromium	70.8%	62.1%
	Vanadium	71.6%	64.2%
	Antimony	64.5%	66.0%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC77526: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC77638 and JC78304: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10(6.0-6.5)A. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

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sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D3(10.0-10.5)A / DUP-19(20181109)	Chromium	25.9	24.3	6.4%
	Nickel	51.9	45.3	13.6%
	Trivalent Chromium	24.9	23.2	7.1%
	Vanadium	24.6	25.4	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-D3(10.0-10.5)A and field duplicate sample DUP-19(20181109) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDG #JC77526: The serial dilution analysis was not performed using a sample from this SDG.

SDGs #JC77638 and JC78304: The serial dilution performed on sample locations SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10(6.0-6.5)A exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X	X		
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC78304: The MS analysis performed on sample location SW-D10-(6.0-6.5)A in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC77526 and JC77638: The MS analysis performed on sample locations BS-F29, SW-D3(6.0-6.5)A, and SW-A3(4.0-4.5)A in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC77526 and JC77638: The MS analysis performed on sample locations BS-F29, SW-D3(6.0-6.5)A, and SW-A3(4.0-4.5)A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-F29	Hexavalent Chromium, Soluble	< 50%	60.8%
SW-D3(6.0-6.5)A	Hexavalent Chromium, Soluble	62.8%	57.0%
SW-A3(4.0-4.5)A	Hexavalent Chromium, Soluble	51.0%	AC (90.3%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC77526: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC77638: The original analyses of the field samples analyzed in the same batch as sample SW-D3(6.0-6.5)A are usable with appropriate qualification. The reanalysis of the field samples analyzed in the same batch as sample SW-A3(4.0-4.5)A are usable; no qualification of the sample results was required since the MS recovery was within the acceptance limits. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC77526, JC77638, and JC78304: The PDS analysis performed on sample locations BS-F29, SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10-(6.0-6.5)A exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC77526, JC77638, and JC78304: The laboratory duplicate analysis performed on sample locations BS-F29, SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10-(6.0-6.5)A exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D3(10.0-10.5)A / DUP-19(20181109)	Hexavalent Chromium	1.0	1.1	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-D3(10.0-10.5)A and field duplicate sample DUP-19(20181109) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-F29 BS-F30	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
All soil samples in SDG #JC77638		Analysis: 4 days	
All soil samples in SDG #JC78304		Analysis: 6 days	
SW-D3(6.0-6.5)A BS-F29	ASTM D3872-86	Analysis: 11 days Analysis: 12 days	< 24 hours from collection
SW-D3(6.0-6.5)A BS-F29	SM4500S2-A	Analysis: 11 days Analysis: 12 days	7 days from collection
SW-D3(6.0-6.5)A	Lloyd Kahn	Analysis: 17 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

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Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC77526: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC77638 and JC78304: The laboratory duplicate analysis performed on sample locations SW-D3(6.0-6.5)A, SW-A3(4.0-4.5)A, and SW-D10-(6.0-6.5)A exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D3(10.0-10.5)A / DUP-19(20181109)	Redox Potential	252	276	9.1%
	pH	7.97	7.91	0.8%

The differences in the results between the parent sample SW-D3(10.0-10.5)A and field duplicate sample DUP-19(20181109) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 16, 2019

PEER REVIEW: Dennis Capria

DATE: May 21, 2019

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CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

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TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusna

E

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes						
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)										Requested Analysis: [Grid of X's for various elements]										Matrix Codes: DW - Drinking Water, GW - Ground Water, WW - Water, SW - Surface Water, SO - Soil, SC - Sludge, SED - Sediment, OL - Oil, LEO - Other Liquid, AIR - Air, SOL - Other Solid, WPT - Waste, FB - Field Blank, EQ - Equipment Blank, RB - Rinse Blank, TB - Trip Blank						
Street Address: 10 Friends Lane, Suite 200, Newtown, PA 18840		Street: 18 Chapel Avenue, Jersey City, NJ										Billing Information (if different from Report to):																
Project Contact: Krista Mearns		Project #										Total Chromium, Hexavalent Chromium, Trivalent Chromium, Arsenic, Nickel, Thallium, Vanadium																
Phone #		Client Purchase Order #																										
Samplers Name(s): Cynthia Buchanan		Project Manager: Jim McLaughlin, Jr.																										
Field ID / Point of Collection	MECHTR Val #	Date	Time	Sampled By	Matrix	# of bottles	HC	MOH	MOH2	MOH3	MOH4	MOH5	MOH6	MOH7	MOH8	MOH9	MOH10	MOH11	MOH12	MOH13	MOH14	MOH15	MOH16	MOH17	MOH18	MOH19	MOH20	LAB USE ONLY
1	FB(20181010)		11/8/18	1330	CB	G	FB	4																				
2	BS-F29		11/8/18	1300	CB	G	SO	1																				
3	BS-F30		11/8/18	1245	CB	G	SO	1																				
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions																
Approved By (OC PM) / Date:		Commercial "A" (Level 1), Commercial "B" (Level 2), NJ Reduced (Level 3), Full Tier 1 (Level 4), Commercial "C", NJ DKOP										NYASP Category A, NYASP Category B, MA MCP Criteria, CT MCP Criteria, State Forms, EDO Format_Encls_										DOD-QSMS						
All data available via Labtrak		Approved by: [Signature]										Commercial "A" = Results only, Commercial "B" = Results + QC Summary, Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/learn-and-conditions						
1. [Signature]		2. [Signature]										3. [Signature]										4. [Signature]						
Date: 11-08-18		Date: 11-08-18										Date: 11-08-18										Date: 11-08-18						
3. [Signature]		4. [Signature]										5. [Signature]										6. [Signature]						
Date: []		Date: []										Date: []										Date: []						
5. [Signature]		6. [Signature]										7. [Signature]										8. [Signature]						
Date: []		Date: []										Date: []										Date: []						

5.2
5

A36
G26
D12

INITIAL ASSESSMENT 3B DM
LABEL VERIFICATION

PPG Site 107_Electronic COCs (version 1)



Report of Analysis

Client Sample ID: FB(20181010)	Date Sampled: 11/08/18
Lab Sample ID: JC77526-1	Date Received: 11/08/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/08/18 18:45	LS	SW846 7196A
Redox Potential Vs H2	280		mv	1	11/10/18 17:53	JOO	ASTM D1498-76
pH ^a	6.06		su	1	11/08/18 17:15	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F29	Date Sampled: 11/08/18
Lab Sample ID: JC77526-2	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	11/12/18 19:40	DC	SW846 3060A/7196A
Redox Potential Vs H2	248		mv	1	11/11/18 11:56	RB	ASTM D1498-76M
Solids, Percent	84.7		%	1	11/09/18 11:12	BG	SM2540 G 18TH ED MOD
pH	8.59 J		su	1	11/11/18 11:56	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F30	Date Sampled: 11/08/18
Lab Sample ID: JC77526-3	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.47	mg/kg	1	11/12/18 19:43	DC	SW846 3060A/7196A
Redox Potential Vs H2	233		mv	1	11/11/18 12:03	RB	ASTM D1498-76M
Solids, Percent	85.9		%	1	11/09/18 11:12	BG	SM2540 G 18TH ED MOD
pH	8.77 J		su	1	11/11/18 12:01	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F29	Date Sampled: 11/08/18
Lab Sample ID: JC77526-2R	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	11/16/18 15:01	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F29		Date Sampled: 11/08/18
Lab Sample ID: JC77526-2RT		Date Received: 11/08/18
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.94 J	0.20	%	1	11/20/18 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/20/18 12:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	1360	120	mg/kg	1	11/21/18 14:34	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F30	Date Sampled: 11/08/18
Lab Sample ID: JC77526-3R	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.47	mg/kg	1	11/16/18 15:03	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20181010)		Date Sampled: 11/08/18
Lab Sample ID: JC77526-1A		Date Received: 11/08/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/09/18	11/12/18	ND	SW846 6010D ¹ SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/09/18	11/12/18	ND	SW846 6010D ¹ SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/09/18	11/12/18	ND	SW846 6010D ¹ SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/09/18	11/12/18	ND	SW846 6010D ¹ SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/09/18	11/12/18	ND	SW846 6010D ¹ SW846 3010A ²

(1) Instrument QC Batch: MA45641

(2) Prep QC Batch: MP10371

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181010)	Date Sampled: 11/08/18
Lab Sample ID: JC77526-1A	Date Received: 11/08/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/12/18 14:30	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F29		Date Sampled: 11/08/18
Lab Sample ID: JC77526-2A		Date Received: 11/08/18
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	20.3	1.2	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	51.2	4.8	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.7	6.0	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45636

(2) Prep QC Batch: MP10347

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F29		Date Sampled: 11/08/18
Lab Sample ID: JC77526-2A		Date Received: 11/08/18
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.9	1.7	mg/kg	1	11/12/18 19:40	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F30	Date Sampled: 11/08/18
Lab Sample ID: JC77526-3A	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	26.6	1.2	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	53.3	4.6	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.6	5.8	mg/kg	1	11/09/18	11/11/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45636

(2) Prep QC Batch: MP10347

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F30	Date Sampled: 11/08/18
Lab Sample ID: JC77526-3A	Date Received: 11/08/18
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.8	1.7	mg/kg	1	11/12/18 19:43	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
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Form containing Client/Reporting Information, Project Information, Collection table, Turn Around Time, and Chain of Custody sections.

5.2 5





CHAIN OF CUSTODY

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JC77638
Page 3 of 3

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, and Sample Custody sections.

5.2
5



Report of Analysis

Client Sample ID: FB(20181109)	Date Sampled: 11/09/18
Lab Sample ID: JC77638-1	Date Received: 11/09/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/09/18 23:25	LS	SW846 7196A
Redox Potential Vs H2	325		mv	1	11/12/18 11:45	RI	ASTM D1498-76
pH ^a	5.19		su	1	11/09/18 19:10	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-19(20181109)	Date Sampled: 11/09/18
Lab Sample ID: JC77638-2	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 78.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.51	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	276		mv	1	11/13/18 12:39	RI	ASTM D1498-76M
Solids, Percent	78.5		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.91 J		su	1	11/13/18 12:40	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-3	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 90.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.44	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	260		mv	1	11/13/18 12:40	RI	ASTM D1498-76M
Solids, Percent	90.8		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	8.24 J		su	1	11/13/18 12:57	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-4		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.47	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	11/13/18 12:43	RI	ASTM D1498-76M
Solids, Percent	85.6		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.88 J		su	1	11/13/18 13:01	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-5	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.46 J-	0.45	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	258		mv	1	11/13/18 12:52	RI	ASTM D1498-76M
Solids, Percent	89.8		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.99 J		su	1	11/13/18 13:11	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-6	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.49	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	11/13/18 12:56	RI	ASTM D1498-76M
Solids, Percent	81.6		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	8.01 J		su	1	11/13/18 13:14	RI	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-7	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	11/13/18 12:57	RI	ASTM D1498-76M
Solids, Percent	82.6		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	8.10 J		su	1	11/13/18 13:15	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-8	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.48	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	268		mv	1	11/13/18 13:08	RI	ASTM D1498-76M
Solids, Percent	82.9		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.63 J		su	1	11/13/18 13:22	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-9	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64 J-	0.43	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	251		mv	1	11/13/18 13:10	RI	ASTM D1498-76M
Solids, Percent	93		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	8.00 J		su	1	11/13/18 13:23	RI	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-10		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.5 J-	0.47	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	244		mv	1	11/13/18 13:14	RI	ASTM D1498-76M
Solids, Percent	85.7		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.89 J		su	1	11/13/18 13:27	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-11	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93 J-	0.45	mg/kg	1	11/13/18 14:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	11/13/18 13:16	RI	ASTM D1498-76M
Solids, Percent	89.4		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.76 J		su	1	11/13/18 13:28	RI	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-12	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.46	mg/kg	1	11/13/18 14:40	DC	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	11/13/18 12:19	RI	ASTM D1498-76M
Solids, Percent	87.4		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.68 J		su	1	11/13/18 12:29	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-13	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	11/13/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	247		mv	1	11/13/18 13:17	RI	ASTM D1498-76M
Solids, Percent	80.9		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	8.09 J		su	1	11/13/18 13:29	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-14	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	11/13/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	252		mv	1	11/13/18 13:18	RI	ASTM D1498-76M
Solids, Percent	81		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.97 J		su	1	11/13/18 13:35	RI	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: BS-G16B	Date Sampled: 11/09/18
Lab Sample ID: JC77638-15	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 69.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.3	0.58	mg/kg	1	11/13/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	207		mv	1	11/13/18 13:23	RI	ASTM D1498-76M
Solids, Percent	69.5		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	6.81 J		su	1	11/13/18 13:33	RI	SW846 9045D

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-A3(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-17	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.47	mg/kg	1	11/13/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	422		mv	1	11/13/18 13:43	RI	ASTM D1498-76M
Solids, Percent	85.7		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	6.92 J		su	1	11/13/18 13:36	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(2.0-2.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-18	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.48	mg/kg	1	11/13/18 13:25	DC	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	11/13/18 13:44	RI	ASTM D1498-76M
Solids, Percent	83.4		%	1	11/10/18 13:04	RC	SM2540 G 18TH ED MOD
pH	7.03 J		su	1	11/13/18 13:37	RI	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A3(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-19	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	20.7	0.44	mg/kg	1	11/13/18 13:20	DC	SW846 3060A/7196A
Redox Potential Vs H2	301		mv	1	11/13/18 12:29	RI	ASTM D1498-76M
Solids, Percent	91		%	1	11/10/18 13:23	RC	SM2540 G 18TH ED MOD
pH	7.21 J		su	1	11/13/18 12:38	RI	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: DUP-19(20181109)	Date Sampled: 11/09/18
Lab Sample ID: JC77638-2R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 78.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	11/16/18 16:20	DC	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-3R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 90.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86	0.44	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-4R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.47	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-5R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.45	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-6R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55	0.49	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-7R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.48	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-8R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	11/16/18 16:20	DC	SW846 3069A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: IC77638-9R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99	0.43	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-10R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.47	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-11R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.45	mg/kg	1	11/16/18 16:20	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-12R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52	0.46	mg/kg	1	11/16/18 16:13	DC	SW846-3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-12RT	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	3.9 J	0.20	%	1	11/20/18 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	11/20/18 12:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	74600 J	110	mg/kg	1	11/26/18 17:38	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-13R		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.49	mg/kg	1	11/15/18 23:26	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-14R		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.49	mg/kg	1	11/15/18 23:26	DC	SW846 3060A/7196A

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: BS-G16B	Date Sampled: 11/09/18
Lab Sample ID: JC77638-15R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 69.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.58	mg/kg	1	11/15/18 23:26	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(0.0-0.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-17R		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93	0.47	mg/kg	1	11/15/18 23:26	DC	SW846 3060A/7196A

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A3(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-18R		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.1	0.48	mg/kg	1	11/15/18 23:26	DC	SW846 3060A/7196A

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A3(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-19R	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.8	0.44	mg/kg	1	11/15/18 23:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: FB(20181109)		Date Sampled: 11/09/18
Lab Sample ID: JC77638-1A		Date Received: 11/09/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/11/18	11/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/11/18	11/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/11/18	11/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/11/18	11/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/11/18	11/13/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45642

(2) Prep QC Batch: MP10385

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181109)	Date Sampled: 11/09/18
Lab Sample ID: JC77638-1A	Date Received: 11/09/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/13/18 02:35	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-19(20181109)		Date Sampled: 11/09/18
Lab Sample ID: JC77638-2A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 78.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	24.3	1.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	45.3	5.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.4	6.6	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-19(20181109)		Date Sampled: 11/09/18
Lab Sample ID: JC77638-2A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 78.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.2	1.8	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)A Lab Sample ID: JC77638-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 90.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.3	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	40.3	4.3	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	70.1	5.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D2(0.0-0.5)A Lab Sample ID: JC77638-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 90.8
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.8	1.5	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-4A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	59.9	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	20.2	4.8	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	30.0	6.0	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(2.0-2.5)A Lab Sample ID: JC77638-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 85.6
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	58.1	1.7	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-5A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	29.3	1.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.2	4.5	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.6	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-5A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.8	1.6	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)A Lab Sample ID: JC77638-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 81.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	30.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	84.4	4.9	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.5	6.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(6.0-6.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-6A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.0	1.7	mg/kg	1	11/13/18 16:00	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)A Lab Sample ID: JC77638-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 82.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.9	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	54.7	4.8	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	6.0	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(8.0-8.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-7A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.9	1.7	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-8A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	19.3	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	50.4	4.8	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	6.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D2(10.0-10.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-8A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.7	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)A Lab Sample ID: JC77638-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 93.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.0	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	27.3	4.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	53.9	5.3	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D3(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-9A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.4	1.5	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-10A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	47.3	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.9	4.8	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	28.6	6.0	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-10A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	43.8	1.7	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-11A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 89.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.2	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	21.3	4.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.0	5.5	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-D3(4.0-4.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-11A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 89.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.3	1.6	mg/kg	1	11/13/18 14:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-12A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	49.5	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	64.4	4.6	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 5.8	5.8	mg/kg	5	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	5.8	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(6.0-6.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-12A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	48.3	1.7	mg/kg	1	11/13/18 14:40	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-13A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	37.9	4.7	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.6	5.9	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(8.0-8.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-13A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.13
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.6 20.8	1.7	mg/kg	1	11/13/18 14:23	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-14A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	25.9	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	51.9	4.9	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.6	6.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D3(10.0-10.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-14A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.9 24.9	1.7	mg/kg	1	11/13/18 14:29	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G16B	Date Sampled: 11/09/18
Lab Sample ID: JC77638-15A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 69.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.6	1.5	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.9	5.8	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.5	7.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G16B	Date Sampled: 11/09/18
Lab Sample ID: JC77638-15A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 69.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.3 12.3	2.1	mg/kg	1	11/13/18 14:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F16A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-16	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 71.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	15.4	5.7	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10381

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(0.0-0.5)A Lab Sample ID: JC77638-17A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 85.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	39.7	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.4	4.7	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.0	5.8	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A3(0.0-0.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-17A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	37.7 38.8	1.7	mg/kg	1	11/13/18 14:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A3(2.0-2.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-18A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.4	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.7	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	5.9	mg/kg	1	11/12/18	11/13/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10392

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(2.0-2.5)A		Date Sampled: 11/09/18
Lab Sample ID: JC77638-18A		Date Received: 11/09/18
Matrix: SO - Soil		Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.18
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.0 11.3	1.7	mg/kg	1	11/13/18 14:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(4.0-4.5)A Lab Sample ID: JC77638-19A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/09/18 Date Received: 11/09/18 Percent Solids: 91.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	48.8 J-	1.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.5	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.0 J-	5.6	mg/kg	1	11/12/18	11/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45649

(2) Prep QC Batch: MP10381

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A3(4.0-4.5)A	Date Sampled: 11/09/18
Lab Sample ID: JC77638-19A	Date Received: 11/09/18
Matrix: SO - Soil	Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.1 34.0	1.5	mg/kg	1	11/13/18 16:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.19
4



50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E
C

Client / Reporting Information		Project Information		Requested Analysis														Matrix Codes						
Company Name: Arcadis		Project Name: PPG Site 107 (JRTS by City)																DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SCD - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank						
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																						
City: Newtown, PA		City: Jersey City																DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SCD - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank						
State: PA		State: NJ																						
Zip: 18440		Company Name:																						
Project Contact: Matthew Bell		Project #: NP000770.0001																						
E-mail:		Street Address:																						
Phone #: 610.755.7080		Client Purchase Order #:																						
Sampers(s) Name(s): C Buchanan / C Cifelli		Project Manager: Jim McLaughlin, Jr.																						
Phone #:		Alterson:																						
Collection:																								
MED+DI Viol #:																								
SGS Sample #	Field ID / Point of Collection	Gas	Time	Sampled by	Level (if Loop #)	Matrix	# of Bottles	INC	NH3	NH4	NO2	NO3	NO3-N	DRUG	MEDC	ENCLOSURE	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY
1	FB(20181120)		11/20/18	1150	CC	G	FB	4										X	X	X	X	X	X	
2	SW-D10(0.0-0.5)A		11/20/18	1200	CC	G	SO	1										X	X	X	X	X	X	All M6
3	SW-D10(2.0-2.5)A		11/20/18	1205	CC	G	SO	1										X	X	X	X	X	X	
4	SW-D10(4.0-4.5)A		11/20/18	1210	CC	G	SO	1										X	X	X	X	X	X	DMS
5	SW-D10(6.0-6.5)A MS		11/20/18	1215	CC	G	SO	1										X	X	X	X	X	X	
6	SW-D10(6.0-6.5)A MSD		11/20/18	1215	CC	G	SO	1										X	X	X	X	X	X	
7	SW-D10(6.0-6.5)A		11/20/18	1215	CC	G	SO	1										X	X	X	X	X	X	
8	SW-D10(8.0-8.5)A		11/20/18	1220	CC	G	SO	1										X	X	X	X	X	X	
9	SW-D4(0.0-0.5)A		11/20/18	1245	CC	G	SO	1										X	X	X	X	X	X	
10	SW-D4(2.0-2.5)A		11/20/18	1250	CC	G	SO	1										X	X	X	X	X	X	
11	SW-D4(4.0-4.5)A		11/20/18	1300	CC	G	SO	1										X	X	X	X	X	X	
12	SW-D4(6.0-6.5)A		11/20/18	1305	CC	G	SO	1										X	X	X	X	X	X	
Turn Around Time (Business Days)		Approved By (SGS PM) / Date		Deliverable		Comments / Special Instructions																		
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved for 1-3 Business Day TAT		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equ...		INITIAL ASSESSMENT <u>JRBA</u> LABEL VERIFICATION _____																
All data available via Lablink		Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only, Commercial "B" = Results + OC Summary Commercial "C" = Results + OC Summary + Partial Raw data		http://www.sgs.com/en/terms-and-conditions																		
Sample Custody must be documented below each time samples change possession, including courier delivery.																								
Requested by: <u>Cifelli</u>	Date / Time: 11/20/18 1335	Received By: Schau 11/20/18 2002	Date / Time: 11/20/18 2002	Requested by: Schau 11/20/18 1607	Date / Time: 11/20/18 1607	Received By: [Signature]																		
Retrieved by:	Date / Time:	Received By:	Date / Time:	Retrieved by:	Date / Time:	Received By:																		
5		5		5		5	Custody Seal # 18080	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent	Therm ID:	On Ice <input checked="" type="checkbox"/>	Cooler Temp. °C												

JC78304

5.2
5

CIP
3.6





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, and Turn Around Time. Includes handwritten signatures and dates.

5.2
5

CIP
3.6

PPG Site 107_Electronic COCs 20181115



Report of Analysis

Client Sample ID: FB(20181120)	Date Sampled: 11/20/18
Lab Sample ID: JC78304-1	Date Received: 11/20/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/20/18 19:20	LS	SW846 7196A
Redox Potential Vs H2	367		mv	1	11/26/18 11:16	RI	ASTM D1498-76
pH ^a	8.14		su	1	11/20/18 16:39	TH	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-2	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.70	0.43	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	293		mv	1	11/26/18 12:55	RI	ASTM D1498-76M
Solids, Percent	93.4		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.24 J		su	1	11/26/18 13:33	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-3	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83	0.48	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	11/26/18 12:58	RI	ASTM D1498-76M
Solids, Percent	82.8		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	7.83 J		su	1	11/26/18 13:39	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-4	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	291		mv	1	11/26/18 13:03	RI	ASTM D1498-76M
Solids, Percent	85.5		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	7.90 J		su	1	11/26/18 14:33	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-5	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.48	mg/kg	1	11/26/18 14:06	DC	SW846 3060A/7196A
Redox Potential Vs H2	292		mv	1	11/26/18 12:52	RI	ASTM D1498-76M
Solids, Percent	83		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.13 J		su	1	11/26/18 13:24	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E30(8.0-8.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-6	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.53	0.48	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	278		mv	1	11/26/18 13:04	RI	ASTM D1498-76M
Solids, Percent	83.1		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.28 J		su	1	11/26/18 14:40	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-7		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.46	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	286		mv	1	11/26/18 13:10	RI	ASTM D1498-76M
Solids, Percent	87		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	7.94 J		su	1	11/26/18 14:45	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-8	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 90.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59	0.44	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	11/26/18 13:15	RI	ASTM D1498-76M
Solids, Percent	90.9		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.23 J		su	1	11/26/18 14:48	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-9	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49	0.46	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	11/26/18 13:21	RI	ASTM D1498-76M
Solids, Percent	87.2		%	1	11/21/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.15 J		su	1	11/26/18 14:50	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-10		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	11/26/18 13:24	RI	ASTM D1498-76M
Solids, Percent	86.6		%	1	11/21/18 10:28	RC	SM2540 G 18TH ED MOD
pH	8.22 J		su	1	11/26/18 14:52	RI	SW846 9045D

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-11	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	11/26/18 13:39	RI	ASTM D1498-76M
Solids, Percent	84.7		%	1	11/21/18 10:28	RC	SM2540 G 18TH ED MOD
pH	7.94 J		su	1	11/26/18 15:06	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-12	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	11/26/18 14:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	11/26/18 14:34	RI	ASTM D1498-76M
Solids, Percent	81.8		%	1	11/21/18 10:28	RC	SM2540 G 18TH ED MOD
pH	8.04 J		su	1	11/26/18 15:08	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H14A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-13	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	11/26/18 14:14	DC	SW846 3060A/7196A
Redox Potential Vs H2	185		mv	1	11/26/18 14:43	RI	ASTM D1498-76M
Solids, Percent	78.4		%	1	11/21/18 10:28	RC	SM2540 G 18TH ED MOD
pH	7.64 J		su	1	11/26/18 15:09	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G14A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-14		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	11/26/18 14:14	DC	SW846 3060A/7196A
Redox Potential Vs H2	161		mv	1	11/26/18 14:48	RI	ASTM D1498-76M
Solids, Percent	81.6		%	1	11/21/18 10:28	RC	SM2540 G 18TH ED MOD
pH	7.49 J		su	1	11/26/18 15:11	RI	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: FB(20181120)		Date Sampled: 11/20/18
Lab Sample ID: JC78304-1A		Date Received: 11/20/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/21/18	11/28/18	GT SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/21/18	11/28/18	GT SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/21/18	11/28/18	GT SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/21/18	11/28/18	GT SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/21/18	11/28/18	GT SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45732

(2) Prep QC Batch: MP10702

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181120)		Date Sampled: 11/20/18
Lab Sample ID: JC78304-1A		Date Received: 11/20/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/28/18 13:46	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-2A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	17.5	1.0	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	26.7	4.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	69.6	5.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(0.0-0.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-2A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.8	1.4	mg/kg	1	11/27/18 03:40	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)A Lab Sample ID: JC78304-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/20/18 Date Received: 11/20/18 Percent Solids: 82.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	35.5	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	18.0	4.7	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.4	5.9	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(2.0-2.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-3A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.7	1.7	mg/kg	1	11/27/18 03:56	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)A Lab Sample ID: JC78304-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/20/18 Date Received: 11/20/18 Percent Solids: 85.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	50.5	1.2	mg/kg	1	11/21/18	11/28/18 GT	SW846 6010D ²	SW846 3050B ³
Nickel	18.0	4.8	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ³
Vanadium	30.7	6.0	mg/kg	1	11/21/18	11/28/18 GT	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA45713
- (2) Instrument QC Batch: MA45731
- (3) Prep QC Batch: MP10723

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(4.0-4.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-4A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	50.1	1.7	mg/kg	1	11/28/18 17:46	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)A Lab Sample ID: JC78304-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/20/18 Date Received: 11/20/18 Percent Solids: 83.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	24.3	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	51.7	4.8	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.8	6.0	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D10(6.0-6.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-5A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.7	1.7	mg/kg	1	11/27/18 03:13	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E30(8.0-8.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-6A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	21.9	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	60.2	4.9	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.4	6.1	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E30(8.0-8.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-6A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.4	1.7	mg/kg	1	11/27/18 04:07	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-7A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	54.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	57.4	4.7	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	95.4	5.9	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D4(0.0-0.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-7A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	53.5	1.7	mg/kg	1	11/27/18 04:12	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)A Lab Sample ID: JC78304-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/20/18 Date Received: 11/20/18 Percent Solids: 90.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	25.1	1.1	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	23.4	4.3	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	26.3	5.3	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D4(2.0-2.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-8A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 90.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.5	1.5	mg/kg	1	11/27/18 04:18	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)A Lab Sample ID: JC78304-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/20/18 Date Received: 11/20/18 Percent Solids: 87.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	24.5	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	43.9	4.6	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.2	5.8	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(4.0-4.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-9A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.0	1.7	mg/kg	1	11/27/18 04:23	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-10A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	21.9	1.1	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	52.3	4.4	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	5.6	mg/kg	1	11/21/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(6.0-6.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-10A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.9	1.6	mg/kg	1	11/27/18 04:28	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-11A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	23.5	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	71.7	4.7	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.8	5.9	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(8.0-8.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-11A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.5	1.7	mg/kg	1	11/27/18 04:34	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-12A	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	18.5	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	57.5	4.8	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	6.0	mg/kg	1	11/21/18	11/27/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D4(10.0-10.5)A		Date Sampled: 11/20/18
Lab Sample ID: JC78304-12A		Date Received: 11/20/18
Matrix: SO - Soil		Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.5	1.7	mg/kg	1	11/27/18 04:39	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H14A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-13R	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	11/26/18	11/30/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	18.9	1.3	mg/kg	1	11/26/18	11/30/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.1	5.0	mg/kg	1	11/26/18	11/30/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/26/18	11/30/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.2	6.3	mg/kg	1	11/26/18	11/30/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45738

(2) Prep QC Batch: MP10755

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H14A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-13R	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.5	1.8	mg/kg	1	11/30/18 01:43	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G14A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-14R	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	11/26/18	11/30/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	11.3	1.3	mg/kg	1	11/26/18	11/30/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	12.3	5.1	mg/kg	1	11/26/18	11/30/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/26/18	11/30/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	15.7	6.3	mg/kg	1	11/26/18	11/30/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45738

(2) Prep QC Batch: MP10755

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G14A	Date Sampled: 11/20/18
Lab Sample ID: JC78304-14R	Date Received: 11/20/18
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.3	1.8	mg/kg	1	11/30/18 01:48	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC77771, JC78026, and JC78445

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32754R

Review Level: Tier III

Project: NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC77771, JC78026, and JC78445 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC77771	FB(20181112)	JC77771-1	Water	11/12/2018		X	X	X
	SW-A4(0.0-0.5)A	JC77771-2	Soil	11/12/2018		X	X	X
	SW-A4(2.0-2.5)A	JC77771-3	Soil	11/12/2018		X	X	X
	SW-A4(4.0-4.5)A	JC77771-4	Soil	11/12/2018		X	X	X
	DUP-20(20181112)	JC77771-5	Soil	11/12/2018	SW-A4(4.0-4.5)A	X	X	X
JC78026	FB(20181115)	JC78026-1	Water	11/15/2018		X	X	X
	BS-H11D	JC78026-2	Soil	11/15/2018		X	X	X
	BS-H12D	JC78026-3	Soil	11/15/2018		X	X	X
	SW-A4(4.0-4.5)	JC78026-4	Soil	11/15/2018		X		X
	DUP-21(20181115)	JC78026-5	Soil	11/15/2018	BS-H12D	X	X	X
JC78445	FB(20181121)	JC78445-1	Water	11/21/2018		X	X	X
	BS-G15A	JC78445-2	Soil	11/21/2018		X	X	X
	BS-H15A	JC78445-3	Soil	11/21/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDG #JC78445: Miscellaneous parameters for sample BS-G15A also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC77771 and JC78445: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC78026: The MS/MSD analysis performed on sample locations BS-H11D exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H11D	Antimony	56.4%	56.7%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC77771 and JC78445: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC78026: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-H11D. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A4(4.0-4.5)A / DUP-20(20181112)	Chromium	30.6	29.2	4.7%
	Trivalent Chromium	27.7	25.8	7.1%
	Nickel	11.7	9.7	AC
	Vanadium	21.4	23.5	
BS-H12D / DUP-21(20181115)	Chromium	13.1	13.2	0.8%
	Trivalent Chromium	11.4	12.1	6.0%
	Nickel	13.2	13.7	AC
	Vanadium	18.7	19.0	

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A4(4.0-4.5)A and field duplicate sample DUP-20(20181112) were acceptable.

The differences in the results between the parent sample BS-H12D and field duplicate sample DUP-21(20181115) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

DATA REVIEW REPORT

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC77771 and JC78445: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC78026: The serial dilution performed on sample location BS-H11D exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC77771 and JC78026: The MS analysis performed on sample locations SW-A4(0.0-0.5)A and BS-H11D in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC77771, JC78026, and JC78445: The MS analysis performed on sample locations SW-A4(0.0-0.5)A, BS-H11D, and BS-G15A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A4(0.0-0.5)A	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-H11D	Hexavalent Chromium, Soluble	73.2%	NA
BS-G15A	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		52.8%

Notes:

NA = Reanalysis was not performed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC77771 and JC78026: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC78445: The reanalyses of the field samples are usable with appropriate qualification. No sample results were rejected.

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC77771 and JC78026: The PDS analysis performed on sample locations SW-A4(0.0-0.5)A and BS-H11D exhibited recoveries within the control limits.

SDG #JC78445: The PDS analysis performed on sample location BS-G15A exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-G15A	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC77771, JC78026, and JC78445: The laboratory duplicate analysis performed on sample locations SW-A4(0.0-0.5)A, BS-H11D, and BS-G15A exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

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Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A4(4.0-4.5)A / DUP-20(20181112)	Hexavalent Chromium	2.9	3.4	15.9%
BS-H12D / DUP-21(20181115)	Hexavalent Chromium	1.7	1.1	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-A4(4.0-4.5)A and field duplicate sample DUP-20(20181112) was acceptable.

The difference in the hexavalent chromium results between the parent sample BS-H12D and field duplicate sample DUP-21(20181115) was acceptable.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

7. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A4(0.0-0.5)A SW-A4(2.0-2.5)A SW-A4(4.0-4.5)A DUP-20(20181112)	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-H11D BS-H12D SW-A4(4.0-4.5) DUP-21(20181115) BS-G15A BS-H15A		Analysis: 4 days	
BS-G15A	ASTM D3872-86	Analysis: 14 days	< 24 hours from collection
BS-G15A	SM4500S2-A	Analysis: 14 days	7 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC77771, JC78026, and JC78445: The laboratory duplicate analysis performed on sample locations SW-A4(0.0-0.5)A, BS-H11D, and BS-G15A exhibited results within the control limit.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A4(4.0-4.5)A / DUP-20(20181112)	Redox Potential	270	265	1.9%
	pH	7.06	7.13	1.0%
BS-H12D/ DUP-21(20181115)	Redox Potential	289	294	1.7%
	pH	7.34	7.58	3.2%

The differences in the results between the parent sample SW-A4(4.0-4.5)A and field duplicate sample DUP-20(20181112) were acceptable.

The differences in the results between the parent sample BS-H12D and field duplicate sample DUP-21(20181115) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 16, 2019

PEER REVIEW: Dennis Capria

DATE: May 22, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



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CHAIN OF CUSTODY

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TEL: 732-329-0200 FAX: 732-329-3499/3480
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E

PEDEX Tracking # CR JS-082418-174
 SGS Occas # JC77771

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes							
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)												DVI - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment CB - CB LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank PB - Petrol Blank TB - TB Blank							
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue																			
City Newtown, PA		City Jersey City																			
State 18440		State NJ																			
Billing Information (if different from Report to)		Billing Information (if different from Report to)																			
Project Contact Krista Macrococo		Project # NP000770.0001																			
Phone # 610.755.7980		Client Purchase Order #																			
Sample Name Cynthia Buchanan		Project Manager Jim McLaughlin, Jr.																			
Field ID / Point of Collection FB(20181112)		MECH/COL Use #																			
Date		Time																			
Sampled by 11/12/18		1145																			
Matrix		# of bottles																			
CB		G																			
SW-44(0.0-0.5JA)		1330																			
SW-44(2.0-2.5JA)		1335																			
SW-44(4.0-4.5JA)		1340																			
DUP-20(20181112)		11/12/18																			
Turn Around Time (Business Days)		Deliverable																			
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other: _____		Approved By (SGS P#) / Date: _____ _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DWQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format - Equus	<input type="checkbox"/> DOD-QSMS INITIAL ASSESSMENT <i>JA</i> LABEL VERIFICATION _____						
Sample Custody must be documented below each time samples change possession, including courier delivery.		Approved needed for 1-3 Business Day SAT																			
Retrieved by: <i>1</i>		Date / Time: <i>11/12/18</i>		Received By: <i>Kobusch</i>		Date / Time: <i>11/12/18</i>		Retrieved by: <i>2</i>		Date / Time: <i>11/12/18</i>		Received By: <i>3</i>		Date / Time: <i>11/12/18</i>		Retrieved by: <i>4</i>		Date / Time: <i>11/12/18</i>		Received By: <i>5</i>	
Custody Seal # 12914		<input type="checkbox"/> Inset <input type="checkbox"/> Not Inset		<input type="checkbox"/> Preserved when indicated <input checked="" type="checkbox"/> Preserved										Other: <i>IP 3.44</i>							

A12
656
D24

5.2
5

Report of Analysis

Client Sample ID: FB(20181112)	Date Sampled: 11/12/18
Lab Sample ID: JC77771-1	Date Received: 11/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/12/18 22:40	LS	SW846 7196A
Redox Potential Vs H2	286		mv	1	11/14/18 21:30	JO	ASTM D1498-76
pH ^a	6.23		su	1	11/11/18 16:58	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4(0.0-0.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-2	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	11/14/18 16:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	11/14/18 19:43	JOO	ASTM D1498-76M
Solids, Percent	85.2		%	1	11/14/18 10:50	RC	SM2540 G 18TH ED MOD
pH	5.34 J		su	1	11/14/18 19:43	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A4(2.0-2.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-3	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 83.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56 J-	0.48	mg/kg	1	11/14/18 17:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	11/14/18 19:45	JOO	ASTM D1498-76M
Solids, Percent	83.3		%	1	11/14/18 10:50	RC	SM2540 G 18TH ED MOD
pH	5.75 J		su	1	11/14/18 19:45	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A4(4.0-4.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-4	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9 J-	0.47	mg/kg	1	11/14/18 17:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	11/14/18 19:46	JOO	ASTM D1498-76M
Solids, Percent	84.5		%	1	11/14/18 10:50	RC	SM2540 G 18TH ED MOD
pH	7.06 J		su	1	11/14/18 19:48	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-20(20181112)	Date Sampled: 11/12/18
Lab Sample ID: JC77771-5	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.4 J-	0.47	mg/kg	1	11/14/18 17:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	11/14/18 19:50	JOO	ASTM D1498-76M
Solids, Percent	84.4		%	1	11/14/18 10:50	RC	SM2540 G 18TH ED MOD
pH	7.13 J		su	1	11/14/18 19:43	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4(0.0-0.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-2R	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89	0.47	mg/kg	1	11/16/18 20:05	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A4(2.0-2.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-3R	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 83.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	11/16/18 20:10	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A4(4.0-4.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-4R	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.47	mg/kg	1	11/16/18 20:10	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-20(2018112)	Date Sampled: 11/12/18
Lab Sample ID: JC77771-5R	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.3	0.47	mg/kg	1	11/16/18 20:10	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(2018112)		Date Sampled: 11/12/18
Lab Sample ID: JC77771-1A		Date Received: 11/12/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/13/18	11/14/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/13/18	11/14/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/13/18	11/14/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/13/18	11/14/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/13/18	11/14/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45652

(2) Prep QC Batch: MP10424

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(2018112)	Date Sampled: 11/12/18
Lab Sample ID: JC77771-1A	Date Received: 11/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/14/18 07:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4(0.0-0.5)A		Date Sampled: 11/12/18
Lab Sample ID: JC77771-2A		Date Received: 11/12/18
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	38.1	1.1	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	20.7	4.5	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.1	5.6	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45651

(2) Prep QC Batch: MP10426

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A4(0.0-0.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-2A	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	37.0	1.6	mg/kg	1	11/14/18 16:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A4(2.0-2.5)A		Date Sampled: 11/12/18
Lab Sample ID: JC77771-3A		Date Received: 11/12/18
Matrix: SO - Soil		Percent Solids: 83.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.3	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.0	5.0	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	17.0	6.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45651

(2) Prep QC Batch: MP10426

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A4(2.0-2.5)A		Date Sampled: 11/12/18
Lab Sample ID: JC77771-3A		Date Received: 11/12/18
Matrix: SO - Soil		Percent Solids: 83.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.7	1.7	mg/kg	1	11/14/18 17:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A4(4.0-4.5)A	Date Sampled: 11/12/18
Lab Sample ID: JC77771-4A	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	30.6	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	4.6	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.4	5.8	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45651

(2) Prep QC Batch: MP10426

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A4(4.0-4.5)A		Date Sampled: 11/12/18
Lab Sample ID: JC77771-4A		Date Received: 11/12/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.7	1.7	mg/kg	1	11/14/18 17:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-20(2018112)		Date Sampled: 11/12/18
Lab Sample ID: JC77771-5A		Date Received: 11/12/18
Matrix: SO - Soil		Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	29.2	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	9.7	4.8	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	6.0	mg/kg	1	11/13/18	11/14/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45651

(2) Prep QC Batch: MP10426

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-20(2018112)	Date Sampled: 11/12/18
Lab Sample ID: JC7771-5A	Date Received: 11/12/18
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.8	1.7	mg/kg	1	11/14/18 17:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)										Requested Analysis										Matrix Codes
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																				DW - Drinking Water
City, State, Zip: Newtown, PA 18440		City, State, Zip: Jersey City NJ																				GW - Ground Water
Project Contact: Name: Cynthia Buchanan Phone: 610.755.7080		Billing Information (if different from Report to): Company Name: Street Address: City, State, Zip:																				WW - Surface Water
Sample(s) Name(s): Cynthia Buchanan		Collection:																				SC - Sediment
Field ID / Point of Collection: FB(20181115)		Date, Time, Matrix, # of bottles, etc.																				SL - Sludge
1		11/15/18 0830 CB G FB 4																				SO - Soil
2		11/15/18 0800 CB G SO 1																				LIQ - Other Liquid
3		11/15/18 0800 CB G SO 1																				SOL - Other Solid
4		11/15/18 0815 CB G SO 1																				WV - WBC
5		11/15/18 1100 CB G SO 1																				FB - Field Blank
																						EQ - Equipment Blank
																						RIS - Rinse Blank
																						TB - Trip Blank
																						LAB USE ONLY
																						A24
																						M13
																						C36
Turn Around Time (Business Days):		Approved By (DOE PM):										Deliverable:										Comments / Special Instructions:
<input type="checkbox"/> 10 Business Days		<input type="checkbox"/> Commercial "A" (Level 1)										<input type="checkbox"/> NYABP Category A										<input type="checkbox"/> DOD-GSM5
<input type="checkbox"/> 5 Business Days		<input type="checkbox"/> Commercial "B" (Level 2)										<input type="checkbox"/> NYABP Category B										
<input type="checkbox"/> 3 Business Days		<input type="checkbox"/> NJ Radford (Level 3)										<input type="checkbox"/> NJ RBCP Criteria										
<input checked="" type="checkbox"/> 2 Business Days		<input type="checkbox"/> Full Tier 1 (Level 4)										<input type="checkbox"/> CT RCP Criteria										
<input type="checkbox"/> 1 Business Day		<input type="checkbox"/> Commercial "C"										<input type="checkbox"/> State Permit										
<input type="checkbox"/> Other		<input type="checkbox"/> NJ DKQP										<input checked="" type="checkbox"/> EDD Format -_Folds_										
All data available via Lablink		Approval needed for 1-3 Business Day TAT										Commercial "A" = Results only; Commercial "B" = Results + QC Summary										http://www.sgs.com/ten/terms-and-conditions
Subsample(s):		Date / Time: 11/15/18 1315										Received By: [Signature]										Date / Time: 11/15/18 1315
3		Date / Time: 3										Received By: [Signature]										Date / Time: 3
5		Date / Time: 5										Received By: [Signature]										Date / Time: 5
		Custody Seal # 086758										<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact										Preserved and sealed by: [Signature]

5.2
5

03.4 GP

INITIAL ASSESSMENT [Signature]
LABEL VERIFICATION [Signature]

Report of Analysis

Client Sample ID: FB(20181115) Lab Sample ID: JC78026-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/15/18 Date Received: 11/15/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/15/18 22:30	LS	SW846 7196A
Redox Potential Vs H2	361		mv	1	11/19/18 09:34	EB	ASTM D1498-76
pH ^a	6.40		su	1	11/15/18 16:24	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H11D	Date Sampled: 11/15/18
Lab Sample ID: JC78026-2	Date Received: 11/15/18
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.49	mg/kg	1	11/19/18 16:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	291		mv	1	11/19/18 14:05	RI	ASTM D1498-76M
Solids, Percent	82.4		%	1	11/16/18 16:19	RC	SM2540 G 18TH ED MOD
pH	7.19 J		su	1	11/19/18 14:08	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12D	Date Sampled: 11/15/18
Lab Sample ID: JC78026-3	Date Received: 11/15/18
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.49	mg/kg	1	11/19/18 16:08	DC	SW846 3060A/7196A
Redox Potential Vs H2	289		mv	1	11/19/18 14:13	RI	ASTM D1498-76M
Solids, Percent	80.9		%	1	11/16/18 16:19	RC	SM2540 G 18TH ED MOD
pH	7.34 J		su	1	11/19/18 14:16	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A4(4.0-4.5)		Date Sampled: 11/15/18
Lab Sample ID: JC78026-4		Date Received: 11/15/18
Matrix: SO - Soil		Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.8 J-	0.45	mg/kg	1	11/19/18 16:08	DC	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	11/19/18 14:16	RI	ASTM D1498-76M
Solids, Percent	89		%	1	11/16/18 16:19	RC	SM2540 G 18TH ED MOD
pH	6.88 J		su	1	11/19/18 14:14	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-21(20181115)	Date Sampled: 11/15/18
Lab Sample ID: JC78026-5	Date Received: 11/15/18
Matrix: SO - Soil	Percent Solids: 81.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.49	mg/kg	1	11/19/18 16:08	DC	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	11/19/18 14:20	RI	ASTM D1498-76M
Solids, Percent	81.3		%	1	11/16/18 16:19	RC	SM2540 G 18TH ED MOD
pH	7.58 J		su	1	11/19/18 14:23	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20181115)		Date Sampled: 11/15/18
Lab Sample ID: JC78026-1A		Date Received: 11/15/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/16/18	11/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/16/18	11/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/16/18	11/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/16/18	11/20/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/16/18	11/20/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45688

(2) Prep QC Batch: MP10540

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181115)	Date Sampled: 11/15/18
Lab Sample ID: JC78026-1A	Date Received: 11/15/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/20/18 00:05	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H11D		Date Sampled: 11/15/18
Lab Sample ID: JC78026-2A		Date Received: 11/15/18
Matrix: SO - Soil		Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.7	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	4.9	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.0	6.1	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45688

(2) Prep QC Batch: MP10555

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H11D		Date Sampled: 11/15/18
Lab Sample ID: JC78026-2A		Date Received: 11/15/18
Matrix: SO - Soil		Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.2	1.7	mg/kg	1	11/19/18 17:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12D		Date Sampled: 11/15/18
Lab Sample ID: JC78026-3A		Date Received: 11/15/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.1	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.2	4.9	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	6.1	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45688

(2) Prep QC Batch: MP10555

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H12D		Date Sampled: 11/15/18
Lab Sample ID: JC78026-3A		Date Received: 11/15/18
Matrix: SO - Soil		Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.4	1.7	mg/kg	1	11/19/18 17:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-21(20181115) Lab Sample ID: JC78026-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/15/18 Date Received: 11/15/18 Percent Solids: 81.3
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.2	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.7	4.7	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.0	5.9	mg/kg	1	11/16/18	11/19/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45688

(2) Prep QC Batch: MP10555

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-21(20181115)	Date Sampled: 11/15/18
Lab Sample ID: JC78026-5A	Date Received: 11/15/18
Matrix: SO - Soil	Percent Solids: 81.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.1	1.7	mg/kg	1	11/19/18 17:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

E

Client / Reporting Information		Project Information			Requested Analysis (see TEST CODE sheet)											Matrix Codes																			
Company Name: <u>Aradis</u>		Project Name: <u>PPA Site 107</u>														MW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																			
Street Address: <u>10 Friends Lane</u>		Street: <u>18 Chapel Ave</u>	Billing Information (if different from Report to)														LAB USE ONLY																		
City: <u>Newtown PA 18440</u>		City: <u>Jersey City NJ</u>	Company Name:																																
Project Contact: <u>Matt Bell</u>		Project #:	Street Address:																																
Phone #:		Fax #:	Client Purchase Order #:																																
Sampler(s) Name(s): <u>Charon C. Falk</u>		Phone #:	Project Manager: <u>Sim McLaughlin</u>																																
Lab Sample #	Field ID / Point of Collection	MEOHDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles																											
								NI	MeOH	HN03	H2SO4	NONE	DI Water	MeOH	ENCORE																				
1	FB (20181121)		11/21/18	0900	CC	FB	4				2		2								X	X	X	X	X	X	X								A34
2	BS-G15A		11/21/18	1130	CC	SO	1						1									X	X	X	X	X	X	X	X	X	X	X		M5	
3	BS-H15A		11/21/18	1200	CC	SO	1						1									X	X	X	X	X	X	X	X	X	X	X		D53	
Turnaround Time (Business days)		Data Deliverable Information			Comments / Special Instructions																														
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____			<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C"				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format <u>Eqw</u> <input type="checkbox"/> Other				Initial Assessment: <u>SPC ZA</u> Label Verification: _____ Date: _____																						
Emergency & Rush T/A data available via LabLink		Approved by (SGS Project Manager)/Date: _____			NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				Sample inventory is verified upon receipt in the Laboratory																										
Sample Custody must be documented below each time samples change possession, including courier delivery.																																			
1	Relinquished by Sampler: <u>[Signature]</u>	Date Time: <u>11/21/18 1355</u>	Received By: <u>[Signature]</u>	Date Time: <u>1636</u>	2	Relinquished by: <u>[Signature]</u>	Date Time: <u>1636</u>	Received By: <u>[Signature]</u>																											
3	Relinquished by Sampler: _____	Date Time: _____	Received By: _____	Date Time: _____	4	Relinquished by: _____	Date Time: _____	Received By: _____																											
5	Relinquished by: _____	Date Time: _____	Received By: _____	Date Time: _____	5	Custody Seal # <u>079656</u>	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		Preserved where applicable: <input type="checkbox"/>				On Ice: <input checked="" type="checkbox"/> Cooler Temp: <u>3.2</u>																						

5.2
5

Report of Analysis

Client Sample ID: FB (20181121) Lab Sample ID: JC78445-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/21/18 Date Received: 11/21/18 Percent Solids: n/a
--	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/21/18 20:50	LS	SW846 7196A
Redox Potential Vs H2	379		mv	1	11/26/18 11:25	RI	ASTM D1498-76
pH ^a	5.69		su	1	11/21/18 18:09	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G15A	Date Sampled: 11/21/18
Lab Sample ID: JC78445-2	Date Received: 11/21/18
Matrix: SO - Soil	Percent Solids: 76.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.52	mg/kg	1	11/27/18 14:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	-13.1		mv	1	11/25/18 13:20	JOO	ASTM D1498-76M
Solids, Percent	76.9		%	1	11/24/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.43 J		su	1	11/25/18 13:20	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H15A	Date Sampled: 11/21/18
Lab Sample ID: JC78445-3	Date Received: 11/21/18
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93	0.52	mg/kg	1	11/27/18 15:04	DC	SW846 3060A/7196A
Redox Potential Vs H2	10.0		mv	1	11/25/18 13:25	JOO	ASTM D1498-76M
Solids, Percent	77.2		%	1	11/24/18 15:00	SF	SM2540 G 18TH ED MOD
pH	7.22 J		su	1	11/25/18 13:25	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G15A		Date Sampled: 11/21/18
Lab Sample ID: JC78445-2R		Date Received: 11/21/18
Matrix: SO - Soil		Percent Solids: 76.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.52	mg/kg	1	11/28/18 17:32	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G15A		Date Sampled: 11/21/18
Lab Sample ID: JC78445-2RT		Date Received: 11/21/18
Matrix: SO - Soil		Percent Solids: 76.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.2 J	0.20	%	1	12/05/18 12:15	ST	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	12/05/18 12:15	HP	SM4500S2- A-11
Total Organic Carbon ^c	27800	130	mg/kg	1	12/03/18 13:31	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H15A	Date Sampled: 11/21/18
Lab Sample ID: JC78445-3R	Date Received: 11/21/18
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.52	mg/kg	1	11/28/18 17:36	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB (20181121) Lab Sample ID: JC78445-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/21/18 Date Received: 11/21/18 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	11/24/18	11/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	11/24/18	11/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	11/24/18	11/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	11/24/18	11/29/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	11/24/18	11/29/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45730

(2) Prep QC Batch: MP10756

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20181121) Lab Sample ID: JC78445-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/21/18 Date Received: 11/21/18 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	11/29/18 00:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G15A		Date Sampled: 11/21/18
Lab Sample ID: JC78445-2A		Date Received: 11/21/18
Matrix: SO - Soil		Percent Solids: 76.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	14.9	1.3	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	15.1	5.1	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	21.7	6.4	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G15A	Date Sampled: 11/21/18
Lab Sample ID: JC78445-2A	Date Received: 11/21/18
Matrix: SO - Soil	Percent Solids: 76.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.8 13.9	1.8	mg/kg	1	11/27/18 14:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H15A		Date Sampled: 11/21/18
Lab Sample ID: JC78445-3A		Date Received: 11/21/18
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	21.8	1.3	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	14.3	5.1	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	21.1	6.4	mg/kg	1	11/24/18	11/27/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45713

(2) Prep QC Batch: MP10723

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H15A	Date Sampled: 11/21/18
Lab Sample ID: JC78445-3A	Date Received: 11/21/18
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.9 20.3	1.8	mg/kg	1	11/27/18 15:04	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC78809, JC79067, JC79072, JC79130, JC79132, and JC79221

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32813R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC78809, JC79067, JC79072, JC79130, JC79132, and JC79221 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC78809	FB(20181130)	JC78809-1	Water	11/30/2018		X	X	X
	108_M018_C	JC78809-2	Soil	11/30/2018		X	X	X
JC79067	FB(20181204)	JC79067-1	Water	12/4/2018		X	X	X
	BS-B6	JC79067-2	Soil	12/4/2018		X	X	X
	BS-B5	JC79067-3	Soil	12/4/2018		X	X	X
JC79072	FB-A1(20181204)	JC79072-1	Water	12/4/2018		X	X	X
	BS-A6T	JC79072-2	Soil	12/4/2018		X	X	X
	BS-A7	JC79072-3	Soil	12/4/2018		X	X	X
JC79130	FB-A1(20181205)	JC79130-1	Water	12/5/2018		X	X	X
	BS-A7T	JC79130-2	Soil	12/5/2018		X	X	X
	BS-A8T	JC79130-3	Soil	12/5/2018		X	X	X
JC79132	FB(20181205)	JC79132-1	Water	12/5/2018		X	X	X
	BS-B7	JC79132-2	Soil	12/5/2018		X	X	X
	BS-B6D	JC79132-3	Soil	12/5/2018		X	X	X
	BS-C6	JC79132-4	Soil	12/5/2018		X	X	X
JC79221	FB(20181206)	JC79221-1	Water	12/6/2018		X	X	X
	BS-C7D	JC79221-2	Soil	12/6/2018		X	X	X
	BS-C8D	JC79221-3	Soil	12/6/2018		X	X	X
	BS-C9D	JC79221-4	Soil	12/6/2018		X	X	X
	BS-B8	JC79221-5	Soil	12/6/2018		X	X	X
	CS-C8 (2)	JC79221-6	Soil	12/6/2018		X	X	X
	BS-B9	JC79221-7	Soil	12/6/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).

DATA REVIEW REPORT

2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC79130 and JC79132: Miscellaneous parameters for samples BS-A7T and BS-B7 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

DATA REVIEW REPORT

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC78809, JC79067, JC79072, and JC79221: The MS analysis performed on sample locations 108_M018_C, BS-B6, BS-A6T, and BS-C7D in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC79130 and JC79132: The MS analysis performed on sample locations BS-A7T and BS-B7 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC79130 and JC79132: The MS analysis performed on sample locations BS-A7T and BS-B7 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-A7T	Hexavalent Chromium, Soluble	72.6%	71.4%
BS-B7	Hexavalent Chromium, Soluble	51.8%	62.1%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

SDGs #JC79130 and JC79132: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

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SDGs #JC78809, JC79067, JC79072, JC79130, JC79132, and JC79221: The PDS analysis performed on sample locations 108_M018_C, BS-B6, BS-A6T, BS-A7T, BS-B7, and BS-C7D exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC78809, JC79067, JC79072, JC79130, JC79132, and JC79221: The laboratory duplicate analysis performed on sample locations 108_M018_C, BS-B6, BS-A6T, BS-A7T, BS-B7, and BS-C7D exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
108_M018_C	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-C7D		Analysis: 4 days	
BS-C8D			
BS-C9D			
BS-B8			
CS-C8 (2)			
BS-B9		Analysis: 6 days	
BS-B6			
BS-B5			
BS-A6T	ASTM D3872-86	Analysis: 7 days	< 24 hours from collection
BS-A7			
BS-A7T			
BS-B7			

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC78809, JC79067, JC79072, and JC79132: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC79130 and JC79221: The laboratory duplicate analysis performed on sample locations BS-A7T and BS-C7D exhibited results within the control limit.

DATA REVIEW REPORT

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 28, 2019

PEER REVIEW: Dennis Capria

DATE: May 31, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB (20181130)	Date Sampled: 11/30/18
Lab Sample ID: JC78809-1	Date Received: 11/30/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	11/30/18 21:54	LS	SW846 7196A
Redox Potential Vs H2	352		mv	1	12/02/18 14:15	JO	ASTM D1498-76
pH ^a	5.50		su	1	11/30/18 18:45	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 108_M018_C	Date Sampled: 11/30/18
Lab Sample ID: JC78809-2	Date Received: 11/30/18
Matrix: SO - Soil	Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.7	0.49	mg/kg	1	12/04/18 13:18	DC	SW846 3060A/7196A
Redox Potential Vs H2	168		mv	1	12/02/18 11:32	JO	ASTM D1498-76M
Solids, Percent	81.4		%	1	12/01/18 12:48	RC	SM2540 G 18TH ED MOD
pH	8.67 J		su	1	12/02/18 11:50	JO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB (20181130) Lab Sample ID: JC78809-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/30/18 Date Received: 11/30/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45759

(2) Prep QC Batch: MP10965

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20181130)	Date Sampled: 11/30/18
Lab Sample ID: JC78809-1A	Date Received: 11/30/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/03/18 17:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018_C Lab Sample ID: JC78809-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 11/30/18 Date Received: 11/30/18 Percent Solids: 81.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	233	1.3	mg/kg	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.0	5.0	mg/kg	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	14.3	6.3	mg/kg	1	12/03/18	12/03/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45758

(2) Prep QC Batch: MP10955

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 108_M018_C	Date Sampled: 11/30/18
Lab Sample ID: JC78809-2A	Date Received: 11/30/18
Matrix: SO - Soil	Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	222	1.8	mg/kg	1	12/04/18 13:18	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20181204)	Date Sampled: 12/04/18
Lab Sample ID: JC79067-1	Date Received: 12/04/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/04/18 22:45	LS	SW846 7196A
Redox Potential Vs H2	260		mv	1	12/10/18 11:52	EB	ASTM D1498-76
pH ^a	5.97		su	1	12/04/18 19:03	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B6	Date Sampled: 12/04/18
Lab Sample ID: JC79067-2	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.47	mg/kg	1	12/10/18 11:15	DC	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	12/10/18 13:15	EB	ASTM D1498-76M
Solids, Percent	84.9		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	7.09 J		su	1	12/10/18 13:17	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B5	Date Sampled: 12/04/18
Lab Sample ID: JC79067-3	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.49	mg/kg	1	12/10/18 11:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	278		mv	1	12/10/18 13:51	EB	ASTM D1498-76M
Solids, Percent	82.4		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	8.80 J		su	1	12/10/18 13:28	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20181204)		Date Sampled: 12/04/18
Lab Sample ID: JC79067-1A		Date Received: 12/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45804

(2) Prep QC Batch: MP11069

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181204)	Date Sampled: 12/04/18
Lab Sample ID: JC79067-1A	Date Received: 12/04/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/07/18 15:12	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B6		Date Sampled: 12/04/18
Lab Sample ID: JC79067-2A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/05/18	12/06/18	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	13.1	1.2	mg/kg	1	12/05/18	12/06/18	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	9.5	4.8	mg/kg	1	12/05/18	12/06/18	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/05/18	12/06/18	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	9.2	5.9	mg/kg	1	12/05/18	12/06/18	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11070

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B6	Date Sampled: 12/04/18
Lab Sample ID: JC79067-2A	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.7	mg/kg	1	12/10/18 11:15	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B5		Date Sampled: 12/04/18
Lab Sample ID: JC79067-3A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	38.5	1.2	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.4	5.0	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.3	6.2	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11070

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B5	Date Sampled: 12/04/18
Lab Sample ID: JC79067-3A	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.6	1.7	mg/kg	1	12/10/18 11:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Client / Reporting Information Company Name: Aroadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: 18440 Zip: 18440 Project Contact: Matthew Ball E-mail: matthew.ball@aroadis.com Phone # 610.756.7080		Project Information Project Name: PPG Site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Billing Information (if different from Report to): Company Name: Project # NP000770.0001 Client Purchase Order # City: State: Zip: Project Manager: Jim McLaughlin, Jr. Attention:		Requested Analysis Matrix Codes: DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipes FB - Field Blank EB - Equipment Blank RB - Reagent Blank TB - Trip Blank											
Turn Around Time (Business Days) <input type="checkbox"/> 18 Business Days <input type="checkbox"/> 9 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: _____		Deliverables: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DQOP <input type="checkbox"/> WAP Category A <input type="checkbox"/> WAP Category B <input type="checkbox"/> MAICP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> ESD Forms, Equip.										Comments / Special Instructions	
Sample # 1 Field ID / Point of Collection: FB-A1(20181204) MED/VOL: 1340 Date: 12/4/18 Time: 1340 Sampled by: CB G FB 4		Sample # 2 Field ID / Point of Collection: BS-A6T MED/VOL: 1300 Date: 12/4/18 Time: 1300 Sampled by: CB G SO 1		Sample # 3 Field ID / Point of Collection: BS-A7 MED/VOL: 1345 Date: 12/4/18 Time: 1345 Sampled by: CB G SO 1		Number of preserved bottles: Total Chromium: X X X X X X X X X X X X Hexavalent Chromium: X X X X X X X X X X X X Trivalent Chromium: X X X X X X X X X X X X Antimony: X X X X X X X X X X X X Nickel: X X X X X X X X X X X X Thallium: X X X X X X X X X X X X Vanadium: X X X X X X X X X X X X									
Approved By: <i>[Signature]</i> Date / Time: 12-4-18 1430		Received By: <i>[Signature]</i> Date / Time: 12-4-18 1430		Approved By: <i>[Signature]</i> Date / Time: 12-4-18 1430		Received By: <i>[Signature]</i> Date / Time: 12-4-18 1430		Approved By: <i>[Signature]</i> Date / Time: 12-4-18 1430		Received By: <i>[Signature]</i> Date / Time: 12-4-18 1430					
Retransmitted By: <i>[Signature]</i> Date / Time:		Retransmitted By: <i>[Signature]</i> Date / Time:		Retransmitted By: <i>[Signature]</i> Date / Time:		Retransmitted By: <i>[Signature]</i> Date / Time:		Retransmitted By: <i>[Signature]</i> Date / Time:		Retransmitted By: <i>[Signature]</i> Date / Time:					

5.2
5

INITIAL ASSESSMENT *JR 3B*
LABEL VERIFICATION _____

Report of Analysis

Client Sample ID: FB-A1(20181204) Lab Sample ID: JC79072-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 12/04/18 Date Received: 12/04/18 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/04/18 22:45	LS	SW846 7196A
Redox Potential Vs H2	258		mv	1	12/10/18 11:55	EB	ASTM D1498-76
pH ^a	5.86		su	1	12/04/18 20:45	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A6T	Date Sampled: 12/04/18
Lab Sample ID: JC79072-2	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.0	0.47	mg/kg	1	12/10/18 13:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	12/10/18 13:14	EB	ASTM D1498-76M
Solids, Percent	84.5		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	7.74 J		su	1	12/10/18 13:12	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A7	Date Sampled: 12/04/18
Lab Sample ID: JC79072-3	Date Received: 12/04/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54	0.48	mg/kg	1	12/10/18 13:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	12/10/18 13:12	EB	ASTM D1498-76M
Solids, Percent	83.5		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	6.36 J		su	1	12/10/18 13:15	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB-A1(20181204)		Date Sampled: 12/04/18
Lab Sample ID: JC79072-1A		Date Received: 12/04/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/05/18	12/07/18 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45804

(2) Prep QC Batch: MP11069

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB-A1(20181204)	Date Sampled: 12/04/18
Lab Sample ID: JC79072-1A	Date Received: 12/04/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/07/18 15:28	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A6T		Date Sampled: 12/04/18
Lab Sample ID: JC79072-2A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	52.3	1.2	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.1	4.6	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	5.8	mg/kg	1	12/05/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11070

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A6T		Date Sampled: 12/04/18
Lab Sample ID: JC79072-2A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	47.3	1.7	mg/kg	1	12/10/18 13:10	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A7		Date Sampled: 12/04/18
Lab Sample ID: JC79072-3A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/05/18	12/07/18	ND SW846 6010D ¹	SW846 3050B ²
Chromium	8.7	1.2	mg/kg	1	12/05/18	12/07/18	ND SW846 6010D ¹	SW846 3050B ²
Nickel	9.4	4.9	mg/kg	1	12/05/18	12/07/18	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/05/18	12/07/18	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	10.7	6.1	mg/kg	1	12/05/18	12/07/18	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11070

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A7		Date Sampled: 12/04/18
Lab Sample ID: JC79072-3A		Date Received: 12/04/18
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.2	1.7	mg/kg	1	12/10/18 13:12	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB-A1(20181205)	Date Sampled: 12/05/18
Lab Sample ID: JC79130-1	Date Received: 12/05/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/05/18 23:05	LS	SW846 7196A
Redox Potential Vs H2	390		mv	1	12/07/18 08:55	RI	ASTM D1498-76
pH ^a	4.36		su	1	12/05/18 16:34	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A7T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-2	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.5 J-	0.48	mg/kg	1	12/07/18 12:48	DC	SW846 3060A/7196A
Redox Potential Vs H2	126		mv	1	12/06/18 13:00	RI	ASTM D1498-76M
Solids, Percent	83.6		%	1	12/06/18 16:30	EB	SM2540 G 18TH ED MOD
pH	10.10		su	1	12/06/18 12:54	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A8T		Date Sampled: 12/05/18
Lab Sample ID: JC79130-3		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.47	mg/kg	1	12/07/18 12:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	196		mv	1	12/06/18 13:09	RI	ASTM D1498-76M
Solids, Percent	84.9		%	1	12/06/18 16:30	EB	SM2540 G 18TH ED MOD
pH	7.77		su	1	12/06/18 13:00	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A7T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-2R	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.48	mg/kg	1	12/11/18 11:34	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A7T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-2RT	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous	0.37 J	0.20	%	1	12/12/18 12:00	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	12/12/18	MP	SM4500S2- A-11
Total Organic Carbon	317	120	mg/kg	1	12/12/18 18:54	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A8T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-3R	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.7	0.47	mg/kg	1	12/11/18 11:36	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB-A1(20181205) Lab Sample ID: JC79130-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 12/05/18 Date Received: 12/05/18 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11083

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB-A1(20181205)		Date Sampled: 12/05/18
Lab Sample ID: JC79130-1A		Date Received: 12/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/07/18 07:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A7T		Date Sampled: 12/05/18
Lab Sample ID: JC79130-2A		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	33.3	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.4	4.7	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	11.4	5.9	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11078

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A7T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-2A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.8	1.7	mg/kg	1	12/07/18 12:48	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A8T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-3A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	279	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	7.3	4.9	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	6.1	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11078

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A8T	Date Sampled: 12/05/18
Lab Sample ID: JC79130-3A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	277	1.7	mg/kg	1	12/07/18 12:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

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2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/e/usa

JC79132

E

Client / Reporting Information		Project Information		Requested Analysis														Matrix Codes																																																																																																																																												
Company Name: Acadia		Project Name: PPG Site 107 (Jersey City)		<table border="1"> <tr><td>Totals</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Trivalent Chromium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Hexavalent Chromium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Arsimony</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Nickel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Thallium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Vanadium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>														Totals																				Trivalent Chromium																				Hexavalent Chromium																				Arsimony																				Nickel																				Thallium																				Vanadium																				DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SD - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
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Vanadium																																																																																																																																																														
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																																																																																																																																																												
City, State, Zip: Newtown, PA 18440		City, State, Zip: Jersey City, NJ																																																																																																																																																												
Project Contact: Matthew Bell		Project #: NP000770.0001																																																																																																																																																												
Phone #: 610.766.7080		Client Purchase Order #:																																																																																																																																																												
Sample(s) Name(s): G. Quinones		Project Manager: Jim McLaughlin, Jr.																																																																																																																																																												
Site Name	Field ID / Point of Collection	MED/ICL Via #	Date	Time	Sampled by	Gross (G)	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY																																																																																																																																											
									ICL	MED/ICL	FA/SL	FP/SL	NR/SL	DI Water	MED/ICL	UNSURE	Trivalent Chromium	Hexavalent Chromium		Arsimony	Nickel	Thallium	Vanadium																																																																																																																																							
1	FB(20181206)		12/5/18	1400	GQ	G	FB	4																																																																																																																																																						
2	BS-B7		12/5/18	1315	GQ	G	SO	1																																																																																																																																																						
3	BS-B6D		12/5/18	1325	GQ	G	SO	1																																																																																																																																																						
4	BS-C6		12/5/18	1320	GQ	G	SO	1																																																																																																																																																						

5.2
5

INITIAL ASSESSMENT JB JK
LABEL VERIFICATION _____

SGS Post Ex Sample COCs 20181130

Report of Analysis

Client Sample ID: FB(20181205)		Date Sampled: 12/05/18
Lab Sample ID: JC79132-1		Date Received: 12/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/05/18 23:05	LS	SW846 7196A
Redox Potential Vs H2	403		mv	1	12/07/18 09:03	RI	ASTM D1498-76
pH ^a	4.55		su	1	12/05/18 16:21	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B7	Date Sampled: 12/05/18
Lab Sample ID: JC79132-2	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.48	mg/kg	1	12/07/18 13:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	235		mv	1	12/06/18 13:20	RI	ASTM D1498-76M
Solids, Percent	82.9		%	1	12/06/18 16:30	EB	SM2540 G 18TH ED MOD
pH	7.77		su	1	12/06/18 13:08	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B6D	Date Sampled: 12/05/18
Lab Sample ID: JC79132-3	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 J-	0.48	mg/kg	1	12/07/18 13:59	DC	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	12/06/18 13:24	RI	ASTM D1498-76M
Solids, Percent	83		%	1	12/06/18 16:30	EB	SM2540 G 18TH ED MOD
pH	7.32		su	1	12/06/18 13:21	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C6		Date Sampled: 12/05/18
Lab Sample ID: JC79132-4		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.1 J-	0.48	mg/kg	1	12/07/18 13:59	DC	SW846 3060A/7196A
Redox Potential Vs H2	282		mv	1	12/06/18 13:30	RI	ASTM D1498-76M
Solids, Percent	83.5		%	1	12/06/18 16:30	EB	SM2540 G 18TH ED MOD
pH	7.56		su	1	12/06/18 13:24	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B7	Date Sampled: 12/05/18
Lab Sample ID: JC79132-2R	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.48	mg/kg	1	12/11/18 12:45	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B7	Date Sampled: 12/05/18
Lab Sample ID: JC79132-2RT	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous	0.57 J	0.20	%	1	12/12/18 12:00	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	12/12/18	MP	SM4500S2- A-11
Total Organic Carbon	878	120	mg/kg	1	12/12/18 19:36	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B6D	Date Sampled: 12/05/18
Lab Sample ID: JC79132-3R	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.48	mg/kg	1	12/11/18 12:47	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C6	Date Sampled: 12/05/18
Lab Sample ID: JC79132-4R	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2	0.48	mg/kg	1	12/11/18 12:47	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20181205)		Date Sampled: 12/05/18
Lab Sample ID: JC79132-1A		Date Received: 12/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11083

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181205)		Date Sampled: 12/05/18
Lab Sample ID: JC79132-1A		Date Received: 12/05/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/07/18 07:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B7	Date Sampled: 12/05/18
Lab Sample ID: JC79132-2A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.9	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.9	4.7	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	15.6	5.9	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11078

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B7	Date Sampled: 12/05/18
Lab Sample ID: JC79132-2A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.7	mg/kg	1	12/07/18 13:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B6D		Date Sampled: 12/05/18
Lab Sample ID: JC79132-3A		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	23.5	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8.0	4.8	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	14.5	6.0	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11078

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B6D		Date Sampled: 12/05/18
Lab Sample ID: JC79132-3A		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.1	1.7	mg/kg	1	12/07/18 13:59	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C6		Date Sampled: 12/05/18
Lab Sample ID: JC79132-4A		Date Received: 12/05/18
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	37.6	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.6	4.9	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.9	6.1	mg/kg	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45795

(2) Prep QC Batch: MP11078

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C6	Date Sampled: 12/05/18
Lab Sample ID: JC79132-4A	Date Received: 12/05/18
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.5	1.7	mg/kg	1	12/07/18 13:59	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC79221

Client / Reporting Information		Project Information						Requested Analysis (see TEST CODE sheet)										Matrix Codes								
Company Name Arcadis		Project Name PPG Jersey City Site 107						<i>Trivalent Chromium</i> <i>Hexavalent Chromium</i> <i>Ammonia</i> <i>Total Chromium</i> <i>Nickel</i> <i>Thallium</i> <i>Vanadium</i>										NW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EQ - Equipment Blank RB - Rinse Blank TB - Trip Blank								
Street Address 10 Friends Lane		Street 18 Chapel Ave																								
City State Zip Newtown PA 18440		City State Jersey City NJ																								
Project Contact Matt Bell		Project # NP000770.0001.0005																								
Phone # 610.762.5629		Client Purchase Order #																								
Sampler(s) Name(s) Christin C. Galli		Project Manager Jim McLaughlin																								
Lab Sample #	Field ID / Point of Collection	MEOHDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	INC	NIQH	HN03	H2SO4	HN04	DI Water	MEDH	ENCORE	LAB USE ONLY										
1	FB (20181206)		12/6/18	1245	CC	FB	4									X	X	X	X	X	X	X	X	X	X	A27
	LD001		12/6/18	1320	CC	SO	1									X	X	X	X	X	X	X	X	X	X	G55
2	BS-C7D		12/6/18	1300	CC	SO	1									X	X	X	X	X	X	X	X	X	X	C38
3	BS-C8D		12/6/18	1305	CC	SO	1									X	X	X	X	X	X	X	X	X	X	
4	BS-C9D		12/6/18	1310	CC	SO	1									X	X	X	X	X	X	X	X	X	X	
5	BS-B8		12/6/18	1315	CC	SO	1									X	X	X	X	X	X	X	X	X	X	
6	CS-C9		12/6/18	1415	CC	SO	1									X	X	X	X	X	X	X	X	X	X	
7	LD001		12/6/18	1320	CC	SO	1									X	X	X	X	X	X	X	X	X	X	

5.2
5

<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other	Approved by (SGS Project Manager)/Date: _____ _____	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equip</i> <input type="checkbox"/> Other	Turnaround Time (Business days) Data Deliverable Information Comments / Special Instructions
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INITIAL ASSESSMENT **3A**
LABEL VERIFICATION

Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory	
Relinquished by: GT	Date Time: 12/6/18 1440	Received By: T. Schwan	Date Time: 12/6/18 230	Relinquished By: T. Schwan	Date Time: 12/6/18 1535	Received By: A	
Relinquished by:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	
Relinquished by:	Date Time:	Received By:	Date Time:	Custody Seal # 12606	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/> On Ice <input checked="" type="checkbox"/> Cooler Temp. CHP	

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Report of Analysis

Client Sample ID: FB(20181206)	Date Sampled: 12/06/18
Lab Sample ID: JC79221-1	Date Received: 12/06/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/06/18 21:55	LS	SW846 7196A
Redox Potential Vs H2	258		mv	1	12/10/18 11:57	EB	ASTM D1498-76
pH ^a	5.22		su	1	12/06/18 16:06	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C7D	Date Sampled: 12/06/18
Lab Sample ID: JC79221-2	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.48	mg/kg	1	12/10/18 12:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	321		mv	1	12/10/18 12:56	EB	ASTM D1498-76M
Solids, Percent	82.8		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	8.13 J		su	1	12/10/18 12:29	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C8D	Date Sampled: 12/06/18
Lab Sample ID: JC79221-3	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.50	mg/kg	1	12/10/18 12:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	282		mv	1	12/10/18 13:03	EB	ASTM D1498-76M
Solids, Percent	80.8		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	7.88 J		su	1	12/10/18 12:34	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C9D	Date Sampled: 12/06/18
Lab Sample ID: JC79221-4	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98	0.49	mg/kg	1	12/10/18 12:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	12/10/18 13:05	EB	ASTM D1498-76M
Solids, Percent	81.5		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	6.99 J		su	1	12/10/18 12:44	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B8		Date Sampled: 12/06/18
Lab Sample ID: JC79221-5		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.95	0.48	mg/kg	1	12/10/18 12:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	269		mv	1	12/10/18 13:07	EB	ASTM D1498-76M
Solids, Percent	84.1		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	8.16 J		su	1	12/10/18 12:57	EB	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: CS-C8 (2)	Date Sampled: 12/06/18
Lab Sample ID: JC79221-6	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	12/10/18 12:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	12/10/18 13:09	EB	ASTM D1498-76M
Solids, Percent	85.5		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	7.67 J		su	1	12/10/18 13:06	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B9	Date Sampled: 12/06/18
Lab Sample ID: JC79221-7	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.53	mg/kg	1	12/10/18 12:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	12/10/18 13:10	EB	ASTM D1498-76M
Solids, Percent	75.9		%	1	12/07/18 16:00	EB	SM2540 G 18TH ED MOD
pH	7.93 J		su	1	12/10/18 13:08	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20181206)		Date Sampled: 12/06/18
Lab Sample ID: JC79221-1A		Date Received: 12/06/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/06/18	12/11/18 ND	SW846 6010D ²	SW846 3010A ³
Chromium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 10	10	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ³
Vanadium	< 50	50	ug/l	1	12/06/18	12/07/18 ND	SW846 6010D ¹	SW846 3010A ³

- (1) Instrument QC Batch: MA45805
- (2) Instrument QC Batch: MA45821
- (3) Prep QC Batch: MP11122

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181206)	Date Sampled: 12/06/18
Lab Sample ID: JC79221-1A	Date Received: 12/06/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/07/18 18:10	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C7D	Date Sampled: 12/06/18
Lab Sample ID: JC79221-2A	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.9	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.7	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.8	5.9	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C7D	Date Sampled: 12/06/18
Lab Sample ID: JC79221-2A	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.7	1.7	mg/kg	1	12/10/18 12:12	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C8D		Date Sampled: 12/06/18
Lab Sample ID: JC79221-3A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.9	4.9	mg/kg	2	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	92.3	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.5	4.9	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.1	6.1	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C8D		Date Sampled: 12/06/18
Lab Sample ID: JC79221-3A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	90.9	1.7	mg/kg	1	12/10/18 12:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C9D		Date Sampled: 12/06/18
Lab Sample ID: JC79221-4A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.7	1.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.6	5.1	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.6	6.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C9D		Date Sampled: 12/06/18
Lab Sample ID: JC79221-4A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.7	1.8	mg/kg	1	12/10/18 12:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B8		Date Sampled: 12/06/18
Lab Sample ID: JC79221-5A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.4	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8.5	4.9	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.5	6.1	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B8	Date Sampled: 12/06/18
Lab Sample ID: JC79221-5A	Date Received: 12/06/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.5	1.7	mg/kg	1	12/10/18 12:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-C8 (2)		Date Sampled: 12/06/18
Lab Sample ID: JC79221-6A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.6	4.6	mg/kg	2	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.1	1.2	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.6	4.6	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 5.8	5.8	mg/kg	5	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.5	5.8	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: CS-C8 (2)	
Lab Sample ID: JC79221-6A	Date Sampled: 12/06/18
Matrix: SO - Soil	Date Received: 12/06/18
	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.1	1.7	mg/kg	1	12/10/18 12:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B9		Date Sampled: 12/06/18
Lab Sample ID: JC79221-7A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.7	1.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.2	5.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.3	6.6	mg/kg	1	12/07/18	12/07/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45805

(2) Prep QC Batch: MP11125

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-B9		Date Sampled: 12/06/18
Lab Sample ID: JC79221-7A		Date Received: 12/06/18
Matrix: SO - Soil		Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.7	1.8	mg/kg	1	12/10/18 12:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC79328, JC79605, JC79901, and JC79968

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32814R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC79328, JC79605, JC79901, and JC79968 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC79328	FB(20181207)	JC79328-1	Water	12/7/2018		X	X	X
	BS-B10	JC79328-2	Soil	12/7/2018		X	X	X
	CS-B7	JC79328-3	Soil	12/7/2018		X	X	X
JC79605	FB(20181212)	JC79605-1	Water	12/12/2018		X	X	X
	BS-B6E	JC79605-2	Soil	12/12/2018		X	X	X
	BS-B5A	JC79605-3	Soil	12/12/2018		X	X	X
	BS-C7E	JC79605-4	Soil	12/12/2018		X	X	X
	BS-C8E	JC79605-5	Soil	12/12/2018		X	X	X
	BS-C9E	JC79605-6	Soil	12/12/2018		X	X	X
JC79901	FB(20181217)	JC79901-1	Water	12/17/2018		X	X	X
	BS-B12	JC79901-2	Soil	12/17/2018		X	X	X
	BS-B12D	JC79901-3	Soil	12/17/2018		X	X	X
JC79968	FB(20181218)	JC79968-1	Water	12/18/2018		X	X	X
	BS-B14	JC79968-2	Soil	12/18/2018		X	X	X
	BS-A9T	JC79968-3	Soil	12/18/2018		X	X	X
	BS-B15	JC79968-4	Soil	12/18/2018		X	X	X
	BS-A11T	JC79968-5	Soil	12/18/2018		X	X	X
	BS-A10T	JC79968-6	Soil	12/18/2018		X	X	X
	BS-A12T	JC79968-7	Soil	12/18/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC79901 and JC79968: Miscellaneous parameters for samples BS-B12D and BS-B14 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC79605: The MS analysis performed on sample locations BS-C7E in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC79328, JC79901, and JC79968: The MS analysis performed on sample locations CS-B7, BS-B12D, and BS-B14 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC79328, JC79901, and JC79968: The MS analysis performed on sample locations CS-B7, BS-B12D, and BS-B14 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
CS-B7	Hexavalent Chromium, Soluble	65.5%	AC (81.5%)
BS-B12D	Hexavalent Chromium, Soluble	56.6%	60.9%
BS-B14	Hexavalent Chromium, Soluble	72.2%	70.7%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC79328: The reanalyses of the field samples are usable. No qualification of the sample results was required.

SDGs #JC79901 and JC79968: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC79328, JC79605, JC79901, and JC79968: The PDS analysis performed on sample locations CS-B7, BS-C7E, BS-B12D, and BS-B14 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC79328, JC79605, JC79901, and JC79968: The laboratory duplicate analysis performed on sample locations CS-B7, BS-C7E, BS-B12D, and BS-B14 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-B12 BS-B12D	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-B10 CS-B7		Analysis: 3 days	
BS-B14 BS-B12D	ASTM D3872-86	Analysis: 11 days	< 24 hours from collection
		Analysis: 12 days	
BS-B14 BS-B12D	SM4500S2-A	Analysis: 11 days	7 days from collection
		Analysis: 12 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC79328 and JC79605: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC79901 and JC79968: The laboratory duplicate analysis performed on sample locations BS-B12 and BS-B14 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 28, 2019

PEER REVIEW: Dennis Capria

DATE: May 31, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: 18440 Zip: 18440 Project Contact: Matthew Bell E-mail: _____ Phone #: 610.756.7080 Sample(s) Name(s): Cifelli 2012848065 Phone #: _____		Project Information Project Name: PPG Site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Project #: NFO00770.0001 Street Address: _____ Client Purchase Order #: _____ City: _____ State: _____ Zip: _____ Project Manager: Jim McLaughlin, Jr. Attention: _____		FED EX Tracking # _____ SGS Quote # _____	Bottle Order Control # LS-082418-189 SGS Job # JC79328
Requested Analysis Total Chromium _____ Hexavalent Chromium _____ Trivalent Chromium _____ Arsenic _____ Nickel _____ Thallium _____ Vanadium _____		Matrix Codes DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		LAB USE ONLY A27 96 29	
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ Approved by (SGS PM) / Date: _____ Approval needed for 1-3 Business Day TAT		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 3) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MAMCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equib____ Commercial "A" = Results only, Commercial "B" = Results + OC Summary Commercial "C" = Results + OC Summary + Partial Raw data		Comments / Special Instructions Initial Assessment <u>4A/JP</u> Label Verification _____ http://www.sgs.com/en/terms-and-conditions	
Sample Custody Date / Time: 12/1/18 1400 Relinquished by: [Signature] Received by: Robert Chambers		Date / Time: 12/2/18 1522 Relinquished by: Robert Chambers Received by: [Signature]		Date / Time: 12-2-18 Relinquished by: _____ Received by: _____ Cutover Site # 083324 <input type="checkbox"/> Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Not intact <input type="checkbox"/> Accept <input type="checkbox"/> Therm. ID _____ On/Off IP Cooler Temp. 32 °C	

5.2 5

Report of Analysis

Client Sample ID: FB(20181207)	Date Sampled: 12/07/18
Lab Sample ID: JC79328-1	Date Received: 12/07/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/07/18 21:30	LS	SW846 7196A
Redox Potential Vs H2	273		mv	1	12/10/18 12:25	EB	ASTM D1498-76
pH ^a	6.16		su	1	12/06/18 15:35	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B10	Date Sampled: 12/07/18
Lab Sample ID: JC79328-2	Date Received: 12/07/18
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.48	mg/kg	1	12/11/18 10:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	249		mv	1	12/10/18 15:18	EB	ASTM D1498-76M
Solids, Percent	83.9		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	8.14 J		su	1	12/10/18 13:37	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-B7	Date Sampled: 12/07/18
Lab Sample ID: JC79328-3	Date Received: 12/07/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2	0.48	mg/kg	1	12/11/18 10:44	DC	SW846 3000A/7190A
Redox Potential Vs H2	248		mv	1	12/10/18 15:21	EB	ASTM D1498-76M
Solids, Percent	84.1		%	1	12/08/18 14:00	RC	SM2540 G 18TH ED MOD
pH	8.07 J		su	1	12/10/18 13:40	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B10		Date Sampled: 12/07/18
Lab Sample ID: JC79328-2R		Date Received: 12/07/18
Matrix: SO - Soil		Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	12/12/18 16:18	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-B7	Date Sampled: 12/07/18
Lab Sample ID: JC79328-3R	Date Received: 12/07/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.48	mg/kg	1	12/12/18 16:16	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20181207)		Date Sampled: 12/07/18
Lab Sample ID: JC79328-1A		Date Received: 12/07/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/08/18	12/11/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/08/18	12/11/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/08/18	12/11/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/08/18	12/11/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/08/18	12/11/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45821

(2) Prep QC Batch: MP11157

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181207)	Date Sampled: 12/07/18
Lab Sample ID: JC79328-1A	Date Received: 12/07/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/11/18 13:07	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B10		Date Sampled: 12/07/18
Lab Sample ID: JC79328-2A		Date Received: 12/07/18
Matrix: SO - Soil		Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	18.0	1.2	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	12.0	4.9	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	6.1	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45814

(2) Prep QC Batch: MP11186

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B10		Date Sampled: 12/07/18
Lab Sample ID: JC79328-2A		Date Received: 12/07/18
Matrix: SO - Soil		Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.0 18.0	1.7	mg/kg	1	12/11/18 10:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-B7	Date Sampled: 12/07/18
Lab Sample ID: JC79328-3A	Date Received: 12/07/18
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	134	1.2	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ³
Nickel	12.2	4.9	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ³
Thallium	< 2.4	2.4	mg/kg	2	12/10/18	12/11/18 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	35.2	6.1	mg/kg	1	12/10/18	12/10/18 GT	SW846 6010D ¹	SW846 3050B ³

(1) Instrument QC Batch: MA45814

(2) Instrument QC Batch: MA45821

(3) Prep QC Batch: MP11186

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-B7		Date Sampled: 12/07/18
Lab Sample ID: JC79328-3A		Date Received: 12/07/18
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	131 133	1.7	mg/kg	1	12/11/18 10:44	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SO
FB

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FEDEX Tracking # **LS-082418-18**
SGS Job # **JC79605**

Client / Reporting Information		Project Information												Requested Analysis										Matrix Codes																														
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)												<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <table border="1"> <tr><td>City</td><td>State</td><td>Zip</td></tr> <tr><td>Newton, PA</td><td>PA</td><td>18440</td></tr> </table> </div> <div style="width: 45%;"> <table border="1"> <tr><td>City</td><td>State</td><td>Company Name</td></tr> <tr><td>Jersey City</td><td>NJ</td><td></td></tr> </table> </div> </div>										City	State	Zip	Newton, PA	PA	18440	City	State	Company Name	Jersey City	NJ		<table border="1"> <tr><td>SW - Drinking Water</td><td>GW - Ground Water</td><td>VW - Vialer</td></tr> <tr><td>SW - Surface Water</td><td>SO - Soil</td><td>SL - Sludge</td></tr> <tr><td>SED - Sediment</td><td>OI - Oil</td><td>LIQ - Other Liquid</td></tr> <tr><td>AS - Air</td><td>SGI - Other Solid</td><td>WV - Vialer</td></tr> <tr><td>FB - Field Blank</td><td>EB - Equipment Blank</td><td>RB - Rinse Blank</td></tr> <tr><td>TB - Trip Blank</td><td></td><td></td></tr> </table>	SW - Drinking Water	GW - Ground Water	VW - Vialer	SW - Surface Water	SO - Soil	SL - Sludge	SED - Sediment	OI - Oil	LIQ - Other Liquid	AS - Air	SGI - Other Solid	WV - Vialer	FB - Field Blank	EB - Equipment Blank	RB - Rinse Blank	TB - Trip Blank		
City	State	Zip																																																				
Newton, PA	PA	18440																																																				
City	State	Company Name																																																				
Jersey City	NJ																																																					
SW - Drinking Water	GW - Ground Water	VW - Vialer																																																				
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TB - Trip Blank																																																						
Billing Information (if different from Report to)		Billing Information (if different from Report to)																																																				
City		State		Zip		City																																																
Project Contact:		E-mail		Project #		Street Address																																																
Phone #		Client Purchase Order #		City		State		Zip																																														
Sample(s) Name(s)		Phone #		Project Manager		Address:																																																
C Buchanan / C Cifelli				Jim McLaughlin, Jr.																																																		
SGS Sample #	Field ID / Point of Collection	METHOD	Date	Time	Sampled By	Date (1) Comp (2)	Matrix	# of bottles	Number of passed bottles										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Arsenite	Nickel	Thallium	Vanadium	LAB USE ONLY																												
									MECH	INCO	INDE	DOWN	MECH	INCO	INDE	DOWN	MECH	INCO									INDE	DOWN																										
1	FB(20181212)		12/12/18	1330	CC	G	FB	4															X	X	X	X	X	X																										
2	BS-BEE		12/12/18	1315	CC	G	BO	1															X	X	X	X	X	X																										
3	BS-BA		12/12/18	1320	CC	G	BO	1															X	X	X	X	X	X																										
4	BS-C7E		12/12/18	1325	CC	G	BO	1															X	X	X	X	X	X																										
5	BS-C8E		12/12/18	1330	CC	G	BO	1															X	X	X	X	X	X																										
6	BS-C9E		12/12/18	1335	CC	G	BO	1															X	X	X	X	X	X																										

All
C23
D37

Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DRGP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EOD Format_Equits	<input type="checkbox"/> DOQ-GEMS

Approval needed for 1-8 Business Day TAT

Initiated by: <i>[Signature]</i>	Date / Time: 12/12/18 14:15	Received by: <i>Robert Chambers</i>	Date / Time: 12-12-18
Initiated by: 5	Date / Time: 5	Received by: 5	Date / Time: 5
Initiated by: 6	Date / Time: 6	Received by: 6	Date / Time: 6

Sample Custody must be documented below each time samples change possession, including courier delivery.

Outsided by: *05018*

Printed where applicable

On bag: *JP 38*

Initial Assessment *[Signature]*

Label Verification *[Signature]*

SGS Post Ex Sample COCs 20181130

5.2
5

Report of Analysis

Client Sample ID: FB(20181212)	Date Sampled: 12/12/18
Lab Sample ID: JC79605-1	Date Received: 12/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/12/18 21:30	RI	SW846 7196A
Redox Potential Vs H2	751		mv	1	12/13/18 13:43	EB	ASTM D1498-76
pH ^a	5.65		su	1	12/12/18 15:30	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B6E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-2	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.90	0.48	mg/kg	1	12/13/18 14:43	DC	SW846 3060A/7196A
Redox Potential Vs H2	207		mv	1	12/13/18 11:35	EB	ASTM D1498-76M
Solids, Percent	83.1		%	1	12/13/18 08:39	RC	SM2540 G 18TH ED MOD
pH	9.26		su	1	12/13/18 11:15	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B5A	Date Sampled: 12/12/18
Lab Sample ID: JC79605-3	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.46	mg/kg	1	12/13/18 14:43	DC	SW846 3060A/7196A
Redox Potential Vs H2	286		mv	1	12/13/18 11:47	EB	ASTM D1498-76M
Solids, Percent	86.5		%	1	12/13/18 08:39	RC	SM2540 G 18TH ED MOD
pH	7.84		su	1	12/13/18 11:20	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C7E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-4	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 81.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.49	mg/kg	1	12/13/18 14:39	DC	SW846 3060A/7196A
Redox Potential Vs H2	243		mv	1	12/13/18 11:54	EB	ASTM D1498-76M
Solids, Percent	81.9		%	1	12/13/18 08:39	RC	SM2540 G 18TH ED MOD
pH	8.11		su	1	12/13/18 11:25	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C8E		Date Sampled: 12/12/18
Lab Sample ID: JC79605-5		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.51	0.48	mg/kg	1	12/13/18 14:43	DC	SW846 3060A/7196A
Redox Potential Vs H2	251		mv	1	12/13/18 12:18	EB	ASTM D1498-76M
Solids, Percent	83.7		%	1	12/13/18 08:39	RC	SM2540 G 18TH ED MOD
pH	8.21		su	1	12/13/18 11:31	EB	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-C9E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-6	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.52	mg/kg	1	12/13/18 14:43	DC	SW846 3060A/7196A
Redox Potential Vs H2	229		mv	1	12/13/18 11:57	EB	ASTM D1498-76M
Solids, Percent	76.7		%	1	12/13/18 08:39	RC	SM2540 G 18TH ED MOD
pH	7.41		su	1	12/13/18 11:36	EB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FB(20181212)		Date Sampled: 12/12/18
Lab Sample ID: JC79605-1A		Date Received: 12/12/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11332

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181212)	Date Sampled: 12/12/18
Lab Sample ID: JC79605-1A	Date Received: 12/12/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/13/18 23:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B6E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-2A	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.2	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.5	4.8	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.7	6.0	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11333

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B6E		Date Sampled: 12/12/18
Lab Sample ID: JC79605-2A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.3	1.7	mg/kg	1	12/13/18 17:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B5A		Date Sampled: 12/12/18
Lab Sample ID: JC79605-3A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	24.6	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.5	4.7	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.8	5.8	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11333

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B5A		Date Sampled: 12/12/18
Lab Sample ID: JC79605-3A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.5	1.7	mg/kg	1	12/13/18 17:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C7E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-4A	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 81.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.1	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.9	4.9	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.6	6.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11333

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C7E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-4A	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 81.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.0	1.7	mg/kg	1	12/13/18 17:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C8E		Date Sampled: 12/12/18
Lab Sample ID: JC79605-5A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10.7	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.8	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	14.0	6.0	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11333

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C8E		Date Sampled: 12/12/18
Lab Sample ID: JC79605-5A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.2	1.7	mg/kg	1	12/13/18 17:54	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C9E		Date Sampled: 12/12/18
Lab Sample ID: JC79605-6A		Date Received: 12/12/18
Matrix: SO - Soil		Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.6	1.3	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.3	5.4	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.6	6.7	mg/kg	1	12/13/18	12/13/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45841

(2) Prep QC Batch: MP11333

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-C9E	Date Sampled: 12/12/18
Lab Sample ID: JC79605-6A	Date Received: 12/12/18
Matrix: SO - Soil	Percent Solids: 76.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.8	mg/kg	1	12/13/18 17:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

FED-EX Tracking #	SGS Job #
SGS Quote #	SGS Job #
15-092818-42	
JG 9101	

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)															Matrix Codes
Company Name Arcadis		Project Name PPG Jersey City Site 107																	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinsate Blank TB - Trip Blank
Street Address 10 Friends Lane		Street 18 Chapel Ave.																	
City Newtown PA 18440		City Scraper City NJ																	
Project Contact M. H. Bell		Project # NPG000770.0001.00008																	
Phone # 646.762.5629		Client Purchase Order #																	
Sampler(s) Name(s) Christian Cibelli 201.264.8005		Project Manager Jim McLaughlin																	

Lab Sample #	Field ID / Point of Collection	MEQ/DI Val #	Collection		Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY							
			Date	Time				HCl	NO3H	PHOS	HS04	NI	SO4	LI Water	MEQ	INCORE									
1	FB (20191217)		12/12/18	1130	CC	FB	4		2	2							X	X	X	X	X	X	X		
2	L-1312 BS-B12		12/12/18	1315	CC	SO	1										X	X	X	X	X	X	X		
3	L-1315 BS-B12D		12/17/18	1330	CC	SO	1										X	X	X	X	X	X	X		

<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other	Approved by (SGS Project Manager)/Date: Initial Assessment Label Verification	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input checked="" type="checkbox"/> NJ Data of Known Quality Protocol Reporting	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Egui <input type="checkbox"/> Other
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Emergency & Rush TIA data available via LabLink

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.	
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1 Relinquished by Sampler:	Date Time: 12/12/18 1446	Received By:	Date Time: 12/13/18 1807	Relinquished by:	Date Time:	Received By:	Date Time:	Custody Seal # 08136	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	<input type="checkbox"/> Preserved where applicable <input checked="" type="checkbox"/> On Ice Cooler Temp: 7.9°C
3 Relinquished by Sampler:	Date Time:	Received By:	Date Time:	Relinquished by:	Date Time:	Received By:	Date Time:			
5 Relinquished by:	Date Time:	Received By:	Date Time:	Relinquished by:	Date Time:	Received By:	Date Time:			

5.2
5

A22
G60
J44

Report of Analysis

Client Sample ID: FB(20181217)	Date Sampled: 12/17/18
Lab Sample ID: JC79901-1	Date Received: 12/17/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/17/18 23:50	LS	SW846 7196A
Redox Potential Vs H2	248		mv	1	12/19/18 10:21	RB	ASTM D1498-76
pH ^a	5.31		su	1	12/18/18 15:49	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B12	Date Sampled: 12/17/18
Lab Sample ID: JC79901-2	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.48	mg/kg	1	12/19/18 13:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	229		mv	1	12/19/18 10:44	RB	ASTM D1498-76M
Solids, Percent	83.9		%	1	12/18/18 09:12	RC	SM2540 G 18TH ED MOD
pH	8.02 J		su	1	12/19/18 10:36	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B12D	Date Sampled: 12/17/18
Lab Sample ID: JC79901-3	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62 J-	0.47	mg/kg	1	12/19/18 13:07	DC	SW846 3060A/7196A
Redox Potential Vs H2	227		mv	1	12/19/18 10:52	RB	ASTM D1498-76M
Solids, Percent	84.5		%	1	12/18/18 09:12	RC	SM2540 G 18TH ED MOD
pH	8.06 J		su	1	12/19/18 10:40	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B12	Date Sampled: 12/17/18
Lab Sample ID: JC79901-2R	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	12/20/18 17:39	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B12D	Date Sampled: 12/17/18
Lab Sample ID: JC79901-3R	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.47	mg/kg	1	12/20/18 17:37	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B12D		Date Sampled: 12/17/18
Lab Sample ID: JC79901-3RT		Date Received: 12/17/18
Matrix: SO - Soil		Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.91 J	0.20	%	1	12/29/18 08:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	12/29/18	MP	SM4500S2- A-11
Total Organic Carbon	633	120	mg/kg	1	12/26/18 16:31	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20181217)		Date Sampled: 12/17/18
Lab Sample ID: JC79901-1A		Date Received: 12/17/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45866

(2) Prep QC Batch: MP11469

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181217)	Date Sampled: 12/17/18
Lab Sample ID: JC79901-1A	Date Received: 12/17/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/18/18 16:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B12	Date Sampled: 12/17/18
Lab Sample ID: JC79901-2A	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.4	1.2	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.8	4.9	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.0	6.1	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45866

(2) Prep QC Batch: MP11471

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B12	Date Sampled: 12/17/18
Lab Sample ID: JC79901-2A	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.4	1.7	mg/kg	1	12/19/18 13:10	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B12D	Date Sampled: 12/17/18
Lab Sample ID: JC79901-3A	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.1	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.5	4.6	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.9	5.7	mg/kg	1	12/18/18	12/18/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45866

(2) Prep QC Batch: MP11471

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B12D	Date Sampled: 12/17/18
Lab Sample ID: JC79901-3A	Date Received: 12/17/18
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.4	1.6	mg/kg	1	12/19/18 13:07	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20181218)	Date Sampled: 12/18/18
Lab Sample ID: JC79968-1	Date Received: 12/18/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/18/18 21:10	LS	SW846 7196A
Redox Potential Vs H2	227		mv	1	12/19/18 11:32	RB	ASTM D1498-76
pH ^a	5.76		su	1	12/18/18 17:40	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B14	Date Sampled: 12/18/18
Lab Sample ID: JC79968-2	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89 J-	0.46	mg/kg	1	12/20/18 14:00	DC	SW846 3060A/7196A
Redox Potential Vs H2	243		mv	1	12/19/18 13:04	RB	ASTM D1498-76M
Solids, Percent	87.3		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	8.02		su	1	12/19/18 12:59	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-3	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 77.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.5 J-	0.51	mg/kg	1	12/20/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	243		mv	1	12/19/18 13:12	RB	ASTM D1498-76M
Solids, Percent	77.8		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	7.14		su	1	12/19/18 13:05	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B15	Date Sampled: 12/18/18
Lab Sample ID: JC79968-4	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	12/20/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	237		mv	1	12/19/18 13:18	RB	ASTM D1498-76M
Solids, Percent	81.4		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	7.42		su	1	12/19/18 13:13	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A11T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-5	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	12/20/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	226		mv	1	12/19/18 13:31	RB	ASTM D1498-76M
Solids, Percent	84		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	10.87		su	1	12/19/18 13:26	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A10T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-6	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 77.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ-	0.52	mg/kg	1	12/20/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	233		mv	1	12/19/18 13:40	RB	ASTM D1498-76M
Solids, Percent	77.4		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	8.06		su	1	12/19/18 13:30	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A12T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-7	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	12/20/18 14:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	232		mv	1	12/19/18 13:58	RB	ASTM D1498-76M
Solids, Percent	79.9		%	1	12/19/18 09:00	RC	SM2540 G 18TH ED MOD
pH	8.31		su	1	12/19/18 13:40	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-B14	Date Sampled: 12/18/18
Lab Sample ID: JC79968-2R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.46	0.46	mg/kg	1	12/22/18 15:20	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B14		Date Sampled: 12/18/18
Lab Sample ID: JC79968-2RT		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	12/29/18 08:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	12/29/18	MP	SM4500S2- A-11
Total Organic Carbon ^c	413	110	mg/kg	1	12/31/18 14:56	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-3R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 77.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	75.4	1.0	mg/kg	2	12/22/18 15:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B15	Date Sampled: 12/18/18
Lab Sample ID: JC79968-4R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.49	mg/kg	1	12/22/18 15:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A11T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-5R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.4	0.48	mg/kg	1	12/22/18 15:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A10T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-6R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 77.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.78	0.52	mg/kg	1	12/22/18 15:25	DC	SW846-3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A12T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-7R	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61	0.50	mg/kg	1	12/22/18 15:25	DC	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20181218)		Date Sampled: 12/18/18
Lab Sample ID: JC79968-1A		Date Received: 12/18/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45871

(2) Prep QC Batch: MP11525

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181218)	Date Sampled: 12/18/18
Lab Sample ID: JC79968-1A	Date Received: 12/18/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/19/18 19:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B14	
Lab Sample ID: JC79968-2A	Date Sampled: 12/18/18
Matrix: SO - Soil	Date Received: 12/18/18
	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.6	1.1	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.5	4.5	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.3	5.6	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B14	Date Sampled: 12/18/18
Lab Sample ID: JC79968-2A	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.6	mg/kg	1	12/20/18 14:00	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-3A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 77.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 5.2	5.2	mg/kg	2	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	1290	2.6	mg/kg	2	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.2	5.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	21.5	13	mg/kg	2	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A9T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-3A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 77.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1280	3.1	mg/kg	1	12/20/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B15		Date Sampled: 12/18/18
Lab Sample ID: JC79968-4A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.2	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	4.7	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.3	5.9	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B15		Date Sampled: 12/18/18
Lab Sample ID: JC79968-4A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 81.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.8	1.7	mg/kg	1	12/20/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A11T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-5A	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.0	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.2	4.9	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.1	6.1	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A11T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-5A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	1.7	mg/kg	1	12/20/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A10T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-6A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 77.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.5	1.3	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.9	5.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	6.5	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A10T	Date Sampled: 12/18/18
Lab Sample ID: JC79968-6A	Date Received: 12/18/18
Matrix: SO - Soil	Percent Solids: 77.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.5	1.8	mg/kg	1	12/20/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A12T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-7A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	20.3	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.8	4.8	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.9	6.0	mg/kg	1	12/19/18	12/19/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45870

(2) Prep QC Batch: MP11532

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-A12T		Date Sampled: 12/18/18
Lab Sample ID: JC79968-7A		Date Received: 12/18/18
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.3	1.7	mg/kg	1	12/20/18 14:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC80126 and JC80320

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32815R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC80126 and JC80320 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC80126	FB(20181220)	JC80126-1	Water	12/20/2018		X	X	X
	BS-B16	JC80126-2	Soil	12/20/2018		X	X	X
	KD006	JC80126-3	Soil	12/20/2018		X	X	X
JC80320	FB(20181226)	JC80320-1	Water	12/26/2018		X	X	X
	BS-C15	JC80320-2	Soil	12/26/2018		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC80126: Miscellaneous parameters for samples KD006 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

DATA REVIEW REPORT

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC80126: The MS analysis performed on sample locations KD006 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC80126 and JC80320: The MS analysis performed on sample locations KD006 and BS-C15 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
KD006	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-C15	Hexavalent Chromium, Insoluble	52.2%	63.3%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC80126 and JC80320: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC80126 and JC80320: The PDS analysis performed on sample locations KD006 and BS-C15 exhibited recoveries within the control limits.

DATA REVIEW REPORT

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC80126 and JC80320: The laboratory duplicate analysis performed on sample locations KD006 and BS-C15 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
KD006	ASTM D3872-86	Analysis: 9 days	< 24 hours from collection
BS-C15		Analysis: 19 days	
KD006	SM4500S2-A	Analysis: 9 days	7 days from collection
BS-C15		Analysis: 19 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method

DATA REVIEW REPORT

blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC80126: The laboratory duplicate analysis performed on sample locations BS-B16 exhibited results within the control limit.

SDG #JC80320: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

DATA REVIEW REPORT

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: May 28, 2019

PEER REVIEW: Dennis Capria

DATE: June 12, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsus

FED-EX Tracking #	Bill of Lading Control #
SGS Quote #	SGS Job #

AN-121018-170
JC80126

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes				
Company Name ARCADIS		Project Name PPG Jersey City Site 107				Total Chromium Hexavalent Chromium Trivalent Chromium Vanadium Thallium Antimony Nickel										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank				
Street Address 10 Friends Lane		Street 18 Chapel Ave		Billing Information (If different from Report to)																
City Newton MA		City Jersey City NJ		Company Name																
State MA		State NJ		Street Address																
Zip 01846		Zip 07006		Client Purchase Order # NT000770-0001-00006																
Project Contact Matt Bell		E-mail		City Jersey City NJ		State NJ		Zip 07006												
Phone #		Fax #		Attention:																
Sampler(s) Name(s) Christina P. Galli		Phone # 201.264.8800		Project Manager Jim McLoughlin																
Collection																				
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	NONE	DI Water	MEOH	ENCODE	LAB USE ONLY				
1	FB (201A1220)		12/20/18	1100	CC	FB	4		2	2						A14				
2	BS-B16		12/20/18	1330	CC	SO	1									G18				
3	KDO06		12/20/18	1345	CC	SO	1									D59				

5.2
5

Turnaround Time (Business days)		Data Deliverable Information		INITIAL ASSESSMENT	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____ _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>	
Emergency & Rush T/A data available via LabLink		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format (Equ)		LABEL VERIFICATION _____ _____	

Sample Custody must be documented below each time samples change possession, including courier delivery.					
1 Relinquished by Sampler: <i>Galli</i>	Date Time: <i>12/20/18 1435</i>	Received By: <i>Chris Paul</i>	1	2 Relinquished by: <i>Chris Paul</i>	Date Time: <i>12/20/18 1505</i>
3 Relinquished by Sampler:	Date Time:	Received By:	3	4 Relinquished By:	Date Time:
5 Relinquished by:	Date Time:	Received By:	5	Custody Seal # <i>066668</i>	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not intact



Report of Analysis

Client Sample ID: FB(20181220)	Date Sampled: 12/20/18
Lab Sample ID: JC80126-1	Date Received: 12/20/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/20/18 19:40	LS	SW846 7196A
Redox Potential Vs H2	589		mv	1	12/21/18 15:33	EB	ASTM D1498-76
pH ^a	5.61		su	1	12/21/18 14:15	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B16	Date Sampled: 12/20/18
Lab Sample ID: JC80126-2	Date Received: 12/20/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.52	mg/kg	1	12/21/18 17:12	DC	SW846 3060A/7196A
Redox Potential Vs H2	232		mv	1	12/21/18 16:32	EB	ASTM D1498-76M
Solids, Percent	76.6		%	1	12/21/18 08:16	RC	SM2540 G 18TH ED MOD
pH	6.86		su	1	12/21/18 15:34	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: KD006	Date Sampled: 12/20/18
Lab Sample ID: JC80126-3	Date Received: 12/20/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.3 J-	0.51	mg/kg	1	12/21/18 17:09	DC	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	12/21/18 16:36	EB	ASTM D1498-76M
Solids, Percent	79		%	1	12/21/18 08:16	RC	SM2540 G 18TH ED MOD
pH	7.01		su	1	12/21/18 15:38	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B16	Date Sampled: 12/20/18
Lab Sample ID: JC80126-2R	Date Received: 12/20/18
Matrix: SO - Soil	Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.69	0.52	mg/kg	1	12/26/18 14:50	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: KD006	Date Sampled: 12/20/18
Lab Sample ID: JC80126-3R	Date Received: 12/20/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.51	mg/kg	1	12/26/18 14:48	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: KD006		Date Sampled: 12/20/18
Lab Sample ID: JC80126-3RT		Date Received: 12/20/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	12/29/18 08:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	12/29/18	MP	SM4500S2- A-11
Total Organic Carbon	204000	130	mg/kg	1	12/31/18 15:43	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181220)		Date Sampled: 12/20/18
Lab Sample ID: JC80126-1A		Date Received: 12/20/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/21/18	12/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/21/18	12/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/21/18	12/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/21/18	12/24/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/21/18	12/24/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45893

(2) Prep QC Batch: MP11612

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181220)	Date Sampled: 12/20/18
Lab Sample ID: JC80126-1A	Date Received: 12/20/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/24/18 18:10	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B16		Date Sampled: 12/20/18
Lab Sample ID: JC80126-2A		Date Received: 12/20/18
Matrix: SO - Soil		Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	12.9	1.2	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	10.9	5.0	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	18.8	6.2	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45886

(2) Prep QC Batch: MP11610

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B16		Date Sampled: 12/20/18
Lab Sample ID: JC80126-2A		Date Received: 12/20/18
Matrix: SO - Soil		Percent Solids: 76.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.7	mg/kg	1	12/22/18 05:18	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: KD006		Date Sampled: 12/20/18
Lab Sample ID: JC80126-3A		Date Received: 12/20/18
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Chromium	61.7	1.3	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Nickel	29.7	5.0	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.6	6.3	mg/kg	1	12/21/18	12/22/18	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45886

(2) Prep QC Batch: MP11610

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: KD006	Date Sampled: 12/20/18
Lab Sample ID: JC80126-3A	Date Received: 12/20/18
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	57.4	1.8	mg/kg	1	12/22/18 05:24	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

FED-EX Tracking #
SGS Quote #
Bottle Chain Control # *AK-12018-180*
SGS Job # *JC80320*

Client / Reporting Information			Project Information															Requested Analysis										Matrix Codes
Company Name: Arcadis			Project Name: PPG Site 107 (Jersey City)															<small> GC - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank FB - Rinse Blank TB - Trip Blank </small>										
Street Address: 10 Friends Lane, Suite 200			Street: 18 Chapel Avenue																									
City, State, Zip: Newtown, PA 18440			City, State, Zip: Jersey City NJ																									
Project Contact: Matthew Bell			Project #: NP000770.0001																									
Phone #: 610.755.7080			Client Purchase Order #:																									
Sampers(s) Name(s): C Buchanan			Project Manager: Jim McLaughlin, Jr.																									
Sample #	Field ID / Point of Collection	MECHDS Val#	Date	Time	Sampled by	Lab. ID / Comp. ID	Matrix	# of bottles	ICD	NICH	HMDS	MONC	DIVINE	MECH	ESCORE	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY					
1	FB(20181226)		12/26/18	1130	CB	G	FB	4			2	2				X	X	X	X	X	X	X						
2	BS-C15		12/26/18	1300	CB	G	BO	1			1	1				X	X	X	X	X	X	X	A23 G5 D40					

5.2
5

INITIAL ASSESSMENT 3B
LABEL VERIFICATION

Report of Analysis

Client Sample ID: FB(20181226)	Date Sampled: 12/26/18
Lab Sample ID: JC80320-1	Date Received: 12/26/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/26/18 21:37	LS	SW846 7196A
Redox Potential Vs H2	712		mv	1	12/27/18 13:14	EB	ASTM D1498-76
pH ^a	5.64		su	1	12/26/18 14:30	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C15	Date Sampled: 12/26/18
Lab Sample ID: JC80320-2	Date Received: 12/26/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	12/27/18 12:09	DC	SW846 3060A/7196A
Redox Potential Vs H2	198		mv	1	12/27/18 11:27	EB	ASTM D1498-76M
Solids, Percent	80.1		%	1	12/27/18 12:00	RC	SM2540 G 18TH ED MOD
pH	7.54		su	1	12/27/18 11:12	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C15	Date Sampled: 12/26/18
Lab Sample ID: JC80320-2R	Date Received: 12/26/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	01/02/19 14:33	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C15	Date Sampled: 12/26/18
Lab Sample ID: JC80320-2RT	Date Received: 12/26/18
Matrix: SO - Soil	Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	01/14/19 11:30	ST	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	01/14/19 11:30	ST	SM4500S2-A-11 R
Total Organic Carbon ^c	38100	120	mg/kg	1	01/09/19 17:22	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20181226)		Date Sampled: 12/26/18
Lab Sample ID: JC80320-1A		Date Received: 12/26/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45902

(2) Prep QC Batch: MP11728

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181226)	Date Sampled: 12/26/18
Lab Sample ID: JC80320-1A	Date Received: 12/26/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/27/18 16:26	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C15		Date Sampled: 12/26/18
Lab Sample ID: JC80320-2A		Date Received: 12/26/18
Matrix: SO - Soil		Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	4.2	2.4	mg/kg	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	42.0	1.2	mg/kg	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	44.2	4.8	mg/kg	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.9	mg/kg	1	12/27/18	12/27/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45904

(2) Prep QC Batch: MP11702

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C15		Date Sampled: 12/26/18
Lab Sample ID: JC80320-2A		Date Received: 12/26/18
Matrix: SO - Soil		Percent Solids: 80.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	41.6	1.7	mg/kg	1	12/27/18 17:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC80585, JC81057, JC81058, JC81147, and JC81225

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32951R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC80585, JC81057, JC81058, JC81147, and JC81225 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC80585	FB(20181228)	JC80585-1	Water	12/28/2018		X	X	X
	BS-114	JC80585-2	Soil	12/28/2018		X	X	X
JC81057	FB(20190109)	JC81057-1	Water	1/9/2019		X	X	X
	SW-A0(0.0-0.5)	JC81057-2	Soil	1/9/2019		X	X	X
	SW-A0(2.0-2.5)	JC81057-3	Soil	1/9/2019		X	X	X
	SW-A0(4.0-4.5)	JC81057-4	Soil	1/9/2019		X	X	X
	SW-A0(6.0-6.5)	JC81057-5	Soil	1/9/2019		X	X	X
	SW-A0(6.5-7.0)	JC81057-6	Soil	1/9/2019		X	X	X
JC81058	FB(20190108)	JC81058-1	Water	1/8/2019		X	X	X
	BS-A5	JC81058-2	Soil	1/8/2019		X	X	X
	107_M020N	JC81058-3	Soil	1/8/2019		X	X	X
JC81147	FB(20190110)-A1	JC81147-1	Water	1/10/2019		X	X	X
	BS-A8	JC81147-2	Soil	1/10/2019		X	X	X
	BS-A9	JC81147-3	Soil	1/10/2019		X	X	X
	BS-A9U	JC81147-4	Soil	1/10/2019		X	X	X
	DUP-1RR(20190110)	JC81147-5	Soil	1/10/2019	BS-A8	X	X	X
JC81225	FB(20190111)-A1	JC81225-1	Water	1/11/2019		X	X	X
	BS-A10	JC81225-2	Soil	1/11/2019		X	X	X
	BS-A11	JC81225-3	Soil	1/11/2019		X	X	X
	BS-A12	JC81225-4	Soil	1/11/2019		X	X	X
	BS-A12S	JC81225-5	Soil	1/11/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.

DATA REVIEW REPORT

3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC81057, JC81147, and JC81225: Miscellaneous parameters for samples SW-A0(2.0-2.5), BS-A9, and BS-A12S also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC80585, JC81057, JC81058, and JC81225: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC81147: The MS/MSD analysis performed on sample locations BS-H11D exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-A9	Antimony	58.4%	61.7%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC80585, JC81057, JC81058, and JC81225: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC81147: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-A9. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-A8 / DUP-1RR(20190110)	Chromium	76.1	55.3	31.7%
	Trivalent Chromium	74.5	52.1	35.4%
	Nickel	8.5	8.5	AC
	Vanadium	17.9	18.2	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-A8 and field duplicate sample DUP-1RR(20190110) were acceptable.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%. The RPDs between the LCS and LCSD results must be within the laboratory-established acceptance limits.

The LCS/LCSD analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

DATA REVIEW REPORT

SDGs #JC80585, JC81057, JC81058, and JC81225: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC81147: All serial dilutions were within control limits, with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
BS-A9	Chromium	10.1%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190108)	SW-846 7196A	Analysis: 35 hours	< 24 hours

Sample results were qualified as specified in the table below. All other holding times were met. Sample FB(20190108) was received by the laboratory past the required 24 hour holding time.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

DATA REVIEW REPORT

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC81058: The MS analysis performed on sample location 107_M020N in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC80585, JC81057, and JC81225: The MS analysis performed on sample locations BS-114, SW-A0(2.0-2.5), and BS-A12S in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC80585, JC81057, JC81147, and JC81225: The MS analysis performed on sample locations BS-114, SW-A0(2.0-2.5), BS-A9, and BS-A12S exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-114	Hexavalent Chromium, Soluble	< 50%	AC (78.6%)
SW-A0(2.0-2.5)	Hexavalent Chromium, Soluble	< 50%	57.2%
BS-A9	Hexavalent Chromium, Insoluble	68.9%	AC (84.8%)
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-A12S	Hexavalent Chromium, Soluble	55.7%	< 50%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

SDG #JC80585: The reanalysis of the field sample is usable. No qualification of the sample results was required.

SDGs #JC81057, JC81147, and JC81225: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC80585, JC81057, JC81058, JC81147, and JC81225: The PDS analysis performed on sample locations BS-114, SW-A0(2.0-2.5), 107_M020N, BS-A9, and BS-A12S exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC80585, JC81057, JC81058, JC81147, and JC81225: The laboratory duplicate analysis performed on sample locations BS-114, SW-A0(2.0-2.5), 107_M020N, BS-A9, and BS-A12S exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-A8 / DUP-1RR(20190110)	Hexavalent Chromium	1.6	3.2	NC

Notes:

NC = Not compliant

The difference in the hexavalent chromium results between the parent sample BS-A8 and field duplicate sample DUP-1RR(20190110) was not in agreement. The associated results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-A5 107_M02N	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-114		Analysis: 3 days	
BS-A10			
BS-A11			
BS-A12 BS-A12S			
BS-A9	ASTM D3872-86	Analysis: 7 days	< 24 hours from collection
SW-A0(2.0-2.5)		Analysis: 8 days	
BS-A12S		Analysis: 12 days	
SW-A0(2.0-2.5)	SM4500S2-A	Analysis: 8 days	7 days from collection
BS-A12S		Analysis: 12 days	

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC80585 and JC81058: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC81057, JC81147, and JC81225: The laboratory duplicate analysis performed on sample locations SW-A0(2.0-2.5), BS-A9, and BS-A12S exhibited results within the control limit.

DATA REVIEW REPORT

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-A8 / DUP-1RR(20190110)	Redox	333	306	8.5%
	pH	6.03	6.04	0.2%

The differences in the results between the parent sample BS-A8 and field duplicate sample DUP-1RR(20190110) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 4, 2019

PEER REVIEW: Dennis Capria

DATE: June 27, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



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FB

CHAIN OF CUSTODY

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www.sgs.com/ehusa

E

Client / Reporting Information			Project Information		Requested Analysis																	Matrix Codes
Company Name: Arcadis			Project Name: PPG Site 102 (Jersey City)		Matrix Codes: DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OF - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																	LAB USE ONLY
Street Address: 10 Friends Lane, Suite 200			Street: 18 Chapel Avenue																			
City, State, Zip: Newtown, PA 18440			City, State, Zip: Jersey City NJ																			
Project Contact: Matthew Bob			Project #: NP000770 0001		Billing Information (if different from Report to)																	Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Nickel Thallium Vanadium
Phone #: 610.755.7080			Client Purchase Order #:		Number of preserved bottles: HCl, HNO ₃ , H ₂ O ₂ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , H ₂ SO ₄																	
Sampler(s) Name(s): C Buchanan			Project Manager: Jim McLaughlin, Jr.		Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other																	
Field ID / Project Collection: FB00011228 (2 of 8 1 2 2 3)			MECHD3 Val#:		Approved by (SGS PM) - Date: Approved needed for 1-3 Business Day TAT																	
Date / Time: 12/28/18 1200			Sampled by: G FB		Deliverable: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP																	
Date / Time: 12/28/18 0915			Sampled by: G SO		Comments / Special Instructions: <p style="text-align: right;">INITIAL ASSESSMENT 3A09</p> <p style="text-align: right;">LABEL VERIFICATION</p>																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	
Date / Time: 12/28/18 1450			Received By: [Signature]		Date / Time: 12/28/18																	

5.2
5

Report of Analysis

Client Sample ID: FB(20181228)	Date Sampled: 12/28/18
Lab Sample ID: JC80585-1	Date Received: 12/28/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	12/28/18 18:17	LS	SW846 7196A
Redox Potential Vs H2	590		mv	1	12/31/18 10:54	RB	ASTM D1498-76
pH ^a	6.65		su	1	12/28/18 16:45	TH	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-114	Date Sampled: 12/28/18
Lab Sample ID: JC80585-2	Date Received: 12/28/18
Matrix: SO - Soil	Percent Solids: 66.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.97	0.60	mg/kg	1	12/31/18 14:55	DC	SW846 3060A/7106A
Redox Potential Vs H2	316		mv	1	12/31/18 14:16	RB	ASTM D1498-76M
Solids, Percent	66.2		%	1	12/29/18 10:00	RC	SM2540 G 18TH ED MOD
pH	8.42 J		su	1	12/31/18 13:50	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-114	Date Sampled: 12/28/18
Lab Sample ID: JC80585-2R	Date Received: 12/28/18
Matrix: SO - Soil	Percent Solids: 66.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.60	0.60	mg/kg	1	01/03/19 12:50	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181228)		Date Sampled: 12/28/18
Lab Sample ID: JC80585-1A		Date Received: 12/28/18
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45916

(2) Prep QC Batch: MP11790

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20181228)	Date Sampled: 12/28/18
Lab Sample ID: JC80585-1A	Date Received: 12/28/18
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	12/31/18 17:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-114		Date Sampled: 12/28/18
Lab Sample ID: JC80585-2A		Date Received: 12/28/18
Matrix: SO - Soil		Percent Solids: 66.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.3	1.5	mg/kg	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	22.2	5.9	mg/kg	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.1	7.4	mg/kg	1	12/31/18	12/31/18 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45917

(2) Prep QC Batch: MP11789

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-114		Date Sampled: 12/28/18
Lab Sample ID: JC80585-2A		Date Received: 12/28/18
Matrix: SO - Soil		Percent Solids: 66.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.3 12.3	2.1	mg/kg	1	12/31/18 14:55	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

50
FB

E

Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: PA Zip: 18440 Project Contact: Matthew Ball Email: _____ Phone #: 610.755.7000 Sampling Name: C Buchanan Phone #: _____		Project Information Project Name: PPG Site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Zip: _____ Billing Information (if different from Report to): _____ Project #: NP000770.0001 Client Purchase Order #: _____ City: _____ State: _____ Zip: _____ Project Manager: Jim McLaughlin, Jr. Attention: _____		Requested Analysis <table border="1"> <tr> <th>Matrix Codes</th> <th>Total Chromium</th> <th>Hexavalent Chromium</th> <th>Trivalent Chromium</th> <th>Arsimony</th> <th>Nickel</th> <th>Thallium</th> <th>Vanadium</th> </tr> <tr> <td>DW - Drinking Water</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>WW - Wastewater</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>SW - Surface Water</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>SO - Soil</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>SL - Sludge</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>SED - Sediment</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>CO - Oil</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>LQ - Other Liquid</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>AIR - Air</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>SOL - Other Solid</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>WP - Waste</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>FB - Field Blank</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>EB - Equipment Blank</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>RB - Rinse Blank</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>TB - Trip Blank</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>										Matrix Codes	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Arsimony	Nickel	Thallium	Vanadium	DW - Drinking Water	X	X	X	X	X	X	X	WW - Wastewater	X	X	X	X	X	X	X	SW - Surface Water	X	X	X	X	X	X	X	SO - Soil	X	X	X	X	X	X	X	SL - Sludge	X	X	X	X	X	X	X	SED - Sediment	X	X	X	X	X	X	X	CO - Oil	X	X	X	X	X	X	X	LQ - Other Liquid	X	X	X	X	X	X	X	AIR - Air	X	X	X	X	X	X	X	SOL - Other Solid	X	X	X	X	X	X	X	WP - Waste	X	X	X	X	X	X	X	FB - Field Blank	X	X	X	X	X	X	X	EB - Equipment Blank	X	X	X	X	X	X	X	RB - Rinse Blank	X	X	X	X	X	X	X	TB - Trip Blank	X	X	X	X	X	X	X
Matrix Codes	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Arsimony	Nickel	Thallium	Vanadium																																																																																																																																						
DW - Drinking Water	X	X	X	X	X	X	X																																																																																																																																						
WW - Wastewater	X	X	X	X	X	X	X																																																																																																																																						
SW - Surface Water	X	X	X	X	X	X	X																																																																																																																																						
SO - Soil	X	X	X	X	X	X	X																																																																																																																																						
SL - Sludge	X	X	X	X	X	X	X																																																																																																																																						
SED - Sediment	X	X	X	X	X	X	X																																																																																																																																						
CO - Oil	X	X	X	X	X	X	X																																																																																																																																						
LQ - Other Liquid	X	X	X	X	X	X	X																																																																																																																																						
AIR - Air	X	X	X	X	X	X	X																																																																																																																																						
SOL - Other Solid	X	X	X	X	X	X	X																																																																																																																																						
WP - Waste	X	X	X	X	X	X	X																																																																																																																																						
FB - Field Blank	X	X	X	X	X	X	X																																																																																																																																						
EB - Equipment Blank	X	X	X	X	X	X	X																																																																																																																																						
RB - Rinse Blank	X	X	X	X	X	X	X																																																																																																																																						
TB - Trip Blank	X	X	X	X	X	X	X																																																																																																																																						
Collection MECHDI Vial # _____ Date: _____ Time: _____ Samples by: _____ Custodian: _____ Matrix: _____ # of bottles: _____ HCL _____ HNO ₃ _____ H ₂ O ₂ _____ H ₂ SO ₄ _____ H ₂ CO ₃ _____ H ₂ PO ₄ _____ H ₂ PO ₃ _____ H ₂ PO ₂ _____ H ₂ PO ₁ _____ H ₂ PO ₀ _____		Number of preserved bottles HCL _____ HNO ₃ _____ H ₂ O ₂ _____ H ₂ SO ₄ _____ H ₂ CO ₃ _____ H ₂ PO ₄ _____ H ₂ PO ₃ _____ H ₂ PO ₂ _____ H ₂ PO ₁ _____ H ₂ PO ₀ _____																																																																																																																																											
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>All data available via Lablink</small>		Approved By (8:00 PM): 7 days: _____ _____ _____ _____ _____ <small>Approval needed for 1-3 Business Day TAT</small>		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> ODD-QIMS <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> FBI Tier 1 (Level 4) <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> Commercial "C" <input type="checkbox"/> State Forms <input type="checkbox"/> NJ DRQP <input checked="" type="checkbox"/> EDD Format_Equas____ <small>Commercial "A" = Results only; Commercial "B" = Results + QC Summary; Commercial "C" = Results + QC Summary + Partial Raw data</small>						Comments / Special Instructions 																																																																																																																																			
<small>Sample Custody must be documented below each time samples change possession, including courier delivery.</small>																																																																																																																																													
1. Prepared By: _____ Date / Time: 01/07/19/13:16 Received By: _____ Date / Time: 1/9/19 16:28		2. Prepared By: _____ Date / Time: _____ Received By: _____ Date / Time: _____		3. Prepared By: _____ Date / Time: _____ Received By: _____ Date / Time: _____		4. Prepared By: _____ Date / Time: _____ Received By: _____ Date / Time: _____		5. Prepared By: _____ Date / Time: _____ Received By: _____ Date / Time: _____		6. Prepared By: _____ Date / Time: _____ Received By: _____ Date / Time: _____																																																																																																																																			
Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Other _____ Not intact <input type="checkbox"/> Account _____ Therm. ID: _____																																																																																																																																													

5.2
5

INITIAL ASSESSMENT LR 28
LABEL VERIFICATION _____

SGS Post Ex Sample COC's 20190109

Report of Analysis

Client Sample ID: FB(20190109) Lab Sample ID: JC81057-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010	0.010	mg/l	1	01/09/19 23:05	LS	SW846 7196A
Redox Potential Vs H2 ^a	491		mv	1	01/10/19 12:02	RI	ASTM D1498-76
pH ^b	6.15		su	1	01/09/19 16:42	FR	SM4500H+ B-11

- (a) Sample received outside the holding time.
- (b) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A0(0.0-0.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-2	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.4 J-	0.47	mg/kg	1	01/10/19 16:32	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	304		mv	1	01/10/19 14:23	RI	ASTM D1498-76M
Solids, Percent	85.2		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	7.67		su	1	01/10/19 13:13	RI	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A0(2.0-2.5) Lab Sample ID: JC81057-3 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 82.2
---	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.4 J-	0.49	mg/kg	1	01/10/19 16:25	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	403		mv	1	01/10/19 14:36	RI	ASTM D1498-76M
Solids, Percent	82.2		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	7.78		su	1	01/10/19 13:21	RI	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A0(4.0-4.5)		Date Sampled: 01/09/18
Lab Sample ID: JC81057-4		Date Received: 01/09/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	3.0 J-	0.49	mg/kg	1	01/10/19 16:32	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	341		mv	1	01/10/19 14:53	RI	ASTM D1498-76M
Solids, Percent	82.3		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	8.01		su	1	01/10/19 14:23	RI	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A0(6.0-6.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-5	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	3.2 J-	0.47	mg/kg	1	01/10/19 16:32	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	299		mv	1	01/10/19 15:28	RI	ASTM D1498-76M
Solids, Percent	85.4		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	8.08		su	1	01/10/19 14:29	RI	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0(6.5-7.0)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-6	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.6 J-	0.55	mg/kg	1	01/10/19 16:32	DC	SW846 3060A/7196A
Redox Potential Vs H2 ^a	374		mv	1	01/10/19 15:40	RI	ASTM D1498-76M
Solids, Percent	72.1		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	7.76		su	1	01/10/19 14:36	RI	SW846 9045D

(a) Sample received outside the holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0(0.0-0.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-2R	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	0.59	0.47	mg/kg	1	01/14/19 15:22	DC	SW846 3060A/7196A

(a) Sample received outside the holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A0(2.0-2.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-3R	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.3	0.49	mg/kg	1	01/14/19 15:15	DC	SW846 3060A/7196A

(a) Sample received outside the holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A0(2.0-2.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-3RT	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.54 J	0.20	%	1	01/17/19 12:10	ST	ASTM D3872-86
Sulfide Screen ^a	NEGATIVE UJ			1	01/17/19 12:10	ST	SM4500S2- A-11
Total Organic Carbon ^a	31200	120	mg/kg	1	01/16/19 18:48	JO	LLOYD KAHN 1988 MOD

(a) Sample received outside the holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0(4.0-4.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-4R	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	0.73	0.49	mg/kg	1	01/14/19 15:22	DC	SW846 3060A/7196A

(a) Sample received outside the holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A0(6.0-6.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-5R	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.9	0.47	mg/kg	1	01/14/19 15:22	DC	SW846 3060A/7196A

(a) Sample received outside the holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0(6.5-7.0)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-6R	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	3.6	0.55	mg/kg	1	01/14/19 15:22	DC	SW846 3060A/7196A

(a) Sample received outside the holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190109) Lab Sample ID: JC81057-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45961

(2) Prep QC Batch: MP12023

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190109)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-1A	Date Received: 01/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/10/19 23:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A0(0.0-0.5) Lab Sample ID: JC81057-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 85.2
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.3	1.1	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	4.5	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	5.6	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A0(0.0-0.5)		Date Sampled: 01/09/18
Lab Sample ID: JC81057-2A		Date Received: 01/09/19
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.9	1.6	mg/kg	1	01/10/19 16:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A0(2.0-2.5) Lab Sample ID: JC81057-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 82.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	39.5	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	24.8	4.7	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.9	5.8	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A0(2.0-2.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-3A	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	38.1	1.7	mg/kg	1	01/10/19 16:25	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A0(4.0-4.5) Lab Sample ID: JC81057-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 82.3
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	25.2	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	28.3	4.8	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	43.6	6.0	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A0(4.0-4.5)		Date Sampled: 01/09/18
Lab Sample ID: JC81057-4A		Date Received: 01/09/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.2	1.7	mg/kg	1	01/10/19 16:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A0(6.0-6.5) Lab Sample ID: JC81057-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 85.4
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	30.9	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	24.2	4.8	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	39.3	6.0	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A0(6.0-6.5)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-5A	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.7	1.7	mg/kg	1	01/10/19 16:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0(6.5-7.0) Lab Sample ID: JC81057-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/09/18 Date Received: 01/09/19 Percent Solids: 72.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	51.5	1.3	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.5	5.3	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	41.3	6.6	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A0(6.5-7.0)	Date Sampled: 01/09/18
Lab Sample ID: JC81057-6A	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	49.9	1.9	mg/kg	1	01/10/19 16:32	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

PAGE 1 OF 1 *E*
PN

FED-EX Tracking #
SGS Quote #
Bottle Rider Control # *AV-21018-187*
SGS Job # *JC81058*

Client/Reporting Information		Project Information		Retention Analysis (see TEST CODE sheet)												Matrix Codes
Company Name <i>Arctadix</i>		Project Name <i>PPG Jersey City Site 107</i>														DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address <i>10 Friends Lane</i>		Street <i>18 Chapel Avenue</i>														
City <i>Newton PA</i>		City <i>Jersey City NJ</i>														
Project Contact <i>Matt Bell</i>		Project # <i>NP000770.0001.00008</i>														
Phone # <i>646.762.5629</i>		Client Purchase Order #														
Sampler(s) Name(s) <i>Christina Cifelli</i>		Project Manager <i>Jim McLaughlin</i>														
Lab Sample #	Field ID / Point of Collection	MEOH/DI Val #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	HNO ₂	DI Water	MEOH	ENCORE	LAB USE ONLY
1	<i>FB(20190108)</i>		<i>1/8/19</i>	<i>1200</i>	<i>CC</i>	<i>FB</i>	<i>4</i>			<i>2</i>	<i>2</i>					<i>A36</i>
2	<i>BS-A5</i>		<i>1/8/19</i>	<i>1245</i>	<i>CC</i>	<i>SO</i>	<i>1</i>									<i>M19</i>
3	<i>107-M020N</i>		<i>1/8/19</i>	<i>1300</i>	<i>CC</i>	<i>SO</i>	<i>1</i>									<i>C37</i>

Turnaround Time (Business days)	Approved by (SGS Project Manager)/Date:	Commercial "A" (Level 1)	Commercial "B" (Level 2)	FULLT1 (Level 3+4)	NJ Reduced	Commercial "C"	NJ Data of Known Quality Protocol Reporting	Commercial "A" = Results Only; Commercial "B" = Results + QC Summary; NJ Reduced = Results + QC Summary + Partial Raw data	Comments / Special Instructions
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		INITIAL ASSESSMENT <i>JLB</i> LABEL VERIFICATION _____

Sample Custody must be documented below each time samples change possession, including courier delivery.					
Relinquished by: <i>CC</i>	Date/Time: <i>1/8/19 1011</i>	Received By: <i>Robert Chambers</i>	Relinquished By: <i>Robert Chambers</i>	Date/Time: <i>1/9/19 1629</i>	Received By: <i>[Signature]</i>
Relinquished by:	Date/Time:	Received By:	Relinquished By:	Date/Time:	Received By:
Relinquished by:	Date/Time:	Received By:	Custody Seal # <i>19258</i>	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/> On ice <input checked="" type="checkbox"/> Cooler Temp. <i>3.30C</i>



5.2
5

Report of Analysis

Client Sample ID: FB(20190108)	Date Sampled: 01/08/19
Lab Sample ID: JC81058-1	Date Received: 01/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010 UJ	0.010	mg/l	1	01/09/19 23:05	LS	SW846 7196A
Redox Potential Vs H2	472		mv	1	01/10/19 12:05	RI	ASTM D1498-76
pH ^b	5.99		su	1	01/09/19 16:50	FR	SM4500H+ B-11

(a) Analysis done out of holding time.

(b) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A5	Date Sampled: 01/08/19
Lab Sample ID: JC81058-2	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	16.5	0.45	mg/kg	1	01/11/19 12:55	DC	SW846 3060A/7196A
Redox Potential Vs H2	141		mv	1	01/10/19 15:51	RI	ASTM D1498-76M
Solids, Percent	88.3		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	10.25 J		su	1	01/10/19 15:40	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_M020N	Date Sampled: 01/08/19
Lab Sample ID: JC81058-3	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	41.5	0.45	mg/kg	1	01/11/19 12:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	212		mv	1	01/10/19 15:59	RI	ASTM D1498-76M
Solids, Percent	88		%	1	01/09/19 09:19	EB	SM2540 G 18TH ED MOD
pH	8.56 J		su	1	01/10/19 15:44	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190108)		Date Sampled: 01/08/19
Lab Sample ID: JC81058-1A		Date Received: 01/09/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/10/19	01/10/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45961

(2) Prep QC Batch: MP12023

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190108)	Date Sampled: 01/08/19
Lab Sample ID: JC81058-1A	Date Received: 01/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/10/19 23:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A5	Date Sampled: 01/08/19
Lab Sample ID: JC81058-2A	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	102	1.2	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.7	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.7	5.9	mg/kg	1	01/09/19	01/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A5		Date Sampled: 01/08/19
Lab Sample ID: JC81058-2A		Date Received: 01/09/19
Matrix: SO - Soil		Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	85.5	1.7	mg/kg	1	01/11/19 12:55	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_M020N Lab Sample ID: JC81058-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/08/19 Date Received: 01/09/19 Percent Solids: 88.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	199	1.1	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.6	4.4	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.5	mg/kg	1	01/09/19	01/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45958

(2) Prep QC Batch: MP12019

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_M020N	Date Sampled: 01/08/19
Lab Sample ID: JC81058-3A	Date Received: 01/09/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	158	1.6	mg/kg	1	01/11/19 12:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

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C

Client/Reporting Information		Project Information								Requested Analysis										Matrix Codes																												
Company Name: Acadis		Project Name: PPG Site 107 (Jersey City)								<table border="1"> <tr> <th>Total Chromium</th> <th>Hexavalent Chromium</th> <th>Trivalent Chromium</th> <th>Antimony</th> <th>Nickel</th> <th>Thallium</th> <th>Vanadium</th> </tr> <tr> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SU - Sludge SED - Sediment OI - Oil LLO - Other Liquid AIR - Air SO ₂ - Other Solid WP - Wipe FB - Field Blank EQ - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium																																										
X	X	X	X	X	X	X																																										
X	X	X	X	X	X	X																																										
X	X	X	X	X	X	X																																										
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue								Billing Information (if different from Report to): Company Name: _____ Street Address: _____ City: _____ State: _____ Zip: _____																																						
City: Newtown, PA Zip: 18440		City: Jersey City State: NJ		Project #: NP000770.0001																																												
Project Contact: Matthew Ball		E-mail:		Client Purchase Order #:																																												
Phone #: 610.766.7080		Phone #:		Project Manager: Jim Molaghan, Jr.				Attention:																																								
Sampler(s) Name(s): C Buchanan		Collection								LAB USE ONLY																																						
Turn Around Time (Business Days)		Deliverable																Comments / Special Instructions																														
<input type="checkbox"/> 18 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date:								<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP								<input type="checkbox"/> BYASP Category A <input type="checkbox"/> BYASP Category B <input type="checkbox"/> MAMCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EOD Format_Eqpt								Initial Assessment 3B (R)																						
All data available via LabLink		Approval needed for 1-8 Business Days								Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Field Note data http://www.sgs.com/in/ehusa-and-conditions																																						
Revised By: _____		Days / Time: 4/10/18 1400				Received By: _____				Days / Time: 1/10/19 0700				Received By: _____																																		
Revised By: _____		Days / Time:				Received By: _____				Days / Time:				Received By: _____																																		
Revised By: _____		Days / Time:				Received By: _____				Days / Time:				Received By: _____																																		
Custody Seal # 27734		<input type="checkbox"/> In use <input type="checkbox"/> Not used <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent Order # 021928 Order Terms ST																																														

5.2
5

Copy of SGS Post Ex Sample COC 2019010

Report of Analysis

Client Sample ID: FB(20190110)-A1	Date Sampled: 01/10/19
Lab Sample ID: JC81147-1	Date Received: 01/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/10/19 21:00	JOO	SW846 7196A
Redox Potential Vs H2	408		mv	1	01/11/19 18:15	JO	ASTM D1498-76
pH ^a	5.47		su	1	01/10/19 17:20	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A8	Date Sampled: 01/10/19
Lab Sample ID: JC81147-2	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J	0.48	mg/kg	1	01/11/19 16:44	DC	SW846 3060A/7196A
Redox Potential Vs H2	333		mv	1	01/11/19 23:16	JO	ASTM D1498-76M
Solids, Percent	83.6		%	1	01/11/19 17:00	RC	SM2540 G 18TH ED MOD
pH	6.03		su	1	01/11/19 23:16	JO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9	Date Sampled: 01/10/19
Lab Sample ID: JC81147-3	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.51	mg/kg	1	01/11/19 16:41	DC	SW846 3060A/7196A
Redox Potential Vs H2	352		mv	1	01/11/19 23:23	JO	ASTM D1498-76M
Solids, Percent	78.3		%	1	01/11/19 17:00	RC	SM2540 G 18TH ED MOD
pH	5.42		su	1	01/11/19 23:23	JO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A9U	Date Sampled: 01/10/19
Lab Sample ID: JC81147-4	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1 J-	0.49	mg/kg	1	01/11/19 16:44	DC	SW846 3060A/7196A
Redox Potential Vs H2	303		mv	1	01/11/19 23:34	JO	ASTM D1498-76M
Solids, Percent	81		%	1	01/11/19 17:00	RC	SM2540 G 18TH ED MOD
pH	7.10		su	1	01/11/19 23:34	JO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-1RR(20190110) Lab Sample ID: JC81147-5 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/10/19 Date Received: 01/10/19 Percent Solids: 83.7
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2 J	0.48	mg/kg	1	01/11/19 16:44	DC	SW846 3060A/7196A
Redox Potential Vs H2	306		mv	1	01/11/19 23:44	JO	ASTM D1498-76M
Solids, Percent	83.7		%	1	01/11/19 17:00	RC	SM2540 G 18TH ED MOD
pH	6.04		su	1	01/11/19 23:44	JO	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A8	Date Sampled: 01/10/19
Lab Sample ID: JC81147-2R	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.0	0.48	mg/kg	1	01/15/19 15:59	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A9	Date Sampled: 01/10/19
Lab Sample ID: JC81147-3R	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	01/15/19 15:55	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9	Date Sampled: 01/10/19
Lab Sample ID: JC81147-3RT	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous	0.95 J	0.20	%	1	01/17/19 12:10	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	01/17/19 12:10	ST	SM4500S2- A-11
Total Organic Carbon	7970	130	mg/kg	1	01/16/19 19:11	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A9U	Date Sampled: 01/10/19
Lab Sample ID: JC81147-4R	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	24.5	0.49	mg/kg	1	01/15/19 15:59	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-1RR(20190110)	Date Sampled: 01/10/19
Lab Sample ID: JC81147-5R	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.1	0.48	mg/kg	1	01/15/19 15:59	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20190110)		Date Sampled: 01/10/19
Lab Sample ID: JC81147-1A		Date Received: 01/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/11/19	01/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/11/19	01/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/11/19	01/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/11/19	01/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/11/19	01/11/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45966

(2) Prep QC Batch: MP12045

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190110)	Date Sampled: 01/10/19
Lab Sample ID: JC81147-1A	Date Received: 01/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/11/19 16:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A8		Date Sampled: 01/10/19
Lab Sample ID: JC81147-2A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	76.1 J	1.1	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8.5	4.6	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.9	5.7	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45966

(2) Prep QC Batch: MP12042

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A8		Date Sampled: 01/10/19
Lab Sample ID: JC81147-2A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	74.5	1.6	mg/kg	1	01/11/19 16:44	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9		Date Sampled: 01/10/19
Lab Sample ID: JC81147-3A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.0 J	1.2	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.9	4.9	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.7	6.1	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45966

(2) Prep QC Batch: MP12042

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A9		Date Sampled: 01/10/19
Lab Sample ID: JC81147-3A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 78.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.7	1.7	mg/kg	1	01/11/19 16:41	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A9U		Date Sampled: 01/10/19
Lab Sample ID: JC81147-4A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.7 UJ-	4.7	mg/kg	2	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	1090 J	2.4	mg/kg	2	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.7	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	25.5	12	mg/kg	2	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45966

(2) Prep QC Batch: MP12042

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A9U	Date Sampled: 01/10/19
Lab Sample ID: JC81147-4A	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1090	2.9	mg/kg	1	01/11/19 16:44	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP(20190110)RR	Date Sampled: 01/10/19
Lab Sample ID: JC81147-5A	Date Received: 01/10/19
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	55.3 J	1.2	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8.5	4.7	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.2	5.9	mg/kg	1	01/10/19	01/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45966

(2) Prep QC Batch: MP12042

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP(20190110)RR		Date Sampled: 01/10/19
Lab Sample ID: JC81147-5A		Date Received: 01/10/19
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	52.1	1.7	mg/kg	1	01/11/19 16:44	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa



E

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes								
Company Name Arcadis 10 Friends Lane, Suite 200 Newtown, PA 18440 Phone # 610.766.7080		Project Name PPG Site 107 (Jersey City) Billing Information (if different from Report to) Company Name Street Address City State Zip Project # Client Purchase Order # Project Manager Attention:										Requested Analysis Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium										Matrix Codes DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SCD - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solids WIP - Wipes FB - Field Blank EQ - Equipment Blank RG - River Blank TB - Trip Blank								
SGS Sample #	Field ID / Point of Collection	MECHVCL Vial #	Date	Time	Sampled by	Drain ID Code (IC)	Matrix	# of bottles	HC1	HC2	HC3	HC4	HC5	HC6	HC7	HC8	HC9	HC10	HC11	HC12	HC13	HC14	HC15	HC16	HC17	HC18	HC19	HC20	LAB USE ONLY	
1	FB(20190111)-A1		1/11/19	1315	CC	G	FB	2																						
2	BSA10		1/10/19	1300	CC	G	SO	1																						A4
3	BSA11		1/10/19	1305	CC	G	SO	1																						M23
4	BSA12		1/10/19	1310	CC	G	SO	1																						
5	BSA12S		1/10/19	1315	CC	G	SO	1																						C39
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions																		
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		Approved by (SGS Pkg.) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DRGP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equid										Comments / Special Instructions 								
1/11/2019																														
1607																														
SGS COURIER																														
SGS COURIER																														
27832																														

INITIAL ASSESSMENT 38 0 2
LABEL VERIFICATION

5.2
5

Copy of SGS Post Ex Sample COCs 20190111



Report of Analysis

Client Sample ID: FB(20190111)-A1	Date Sampled: 01/11/19
Lab Sample ID: JC81225-1	Date Received: 01/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/11/19 18:30	DC	SW846 7196A
Redox Potential Vs H2	269		mv	1	01/14/19 15:32	RI	ASTM D1498-76
pH ^a	6.47		su	1	01/11/19 16:41	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A10	Date Sampled: 01/11/19
Lab Sample ID: JC81225-2	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.46	mg/kg	1	01/15/19 14:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	268		mv	1	01/14/19 15:53	RI	ASTM D1498-76M
Solids, Percent	86.2		%	1	01/12/19 13:30	RC	SM2540 G 18TH ED MOD
pH	6.75 J		su	1	01/14/19 15:26	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A11	Date Sampled: 01/11/19
Lab Sample ID: JC81225-3	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9 J-	0.46	mg/kg	1	01/15/19 14:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	265		mv	1	01/14/19 15:55	RI	ASTM D1498-76M
Solids, Percent	86.8		%	1	01/12/19 13:30	RC	SM2540 G 18TH ED MOD
pH	7.59 J		su	1	01/14/19 15:32	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A12		Date Sampled: 01/11/19
Lab Sample ID: JC81225-4		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2 J-	0.51	mg/kg	1	01/15/19 14:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	01/14/19 15:59	RI	ASTM D1498-76M
Solids, Percent	77.9		%	1	01/12/19 13:30	RC	SM2540 G 18TH ED MOD
pH	7.23 J		su	1	01/14/19 15:36	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A12S	Date Sampled: 01/11/19
Lab Sample ID: JC81225-5	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 J-	0.46	mg/kg	1	01/15/19 14:55	DC	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	01/14/19 16:02	RI	ASTM D1498-76M
Solids, Percent	86.5		%	1	01/12/19 13:30	RC	SM2540 G 18TH ED MOD
pH	6.64 J		su	1	01/14/19 15:42	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A10	Date Sampled: 01/11/19
Lab Sample ID: JC81225-2R	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.46	mg/kg	1	01/16/19 18:04	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A11	Date Sampled: 01/11/19
Lab Sample ID: JC81225-3R	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.3	0.46	mg/kg	1	01/16/19 18:04	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A12	Date Sampled: 01/11/19
Lab Sample ID: JC81225-4R	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.5	0.51	mg/kg	1	01/16/19 18:04	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A12S	Date Sampled: 01/11/19
Lab Sample ID: JC81225-5R	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.75	0.46	mg/kg	1	01/16/19 18:00	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A12S	Date Sampled: 01/11/19
Lab Sample ID: JC81225-5RT	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.63 J	0.20	%	1	01/23/19 13:10	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	01/23/19 13:10	MP	SM4500S2- A-11
Total Organic Carbon ^c	13500	120	mg/kg	1	01/18/19 20:58	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190111)-A1	Date Sampled: 01/11/19
Lab Sample ID: JC81225-1A	Date Received: 01/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/12/19	01/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/12/19	01/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/12/19	01/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/12/19	01/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/12/19	01/14/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45977

(2) Prep QC Batch: MP12063

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190111)-A1	Date Sampled: 01/11/19
Lab Sample ID: JC81225-1A	Date Received: 01/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/14/19 16:18	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A10		Date Sampled: 01/11/19
Lab Sample ID: JC81225-2A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/11/19	01/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.0	1.1	mg/kg	1	01/11/19	01/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8.1	4.6	mg/kg	1	01/11/19	01/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/11/19	01/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	5.7	mg/kg	1	01/11/19	01/14/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45974

(2) Prep QC Batch: MP12061

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A10		Date Sampled: 01/11/19
Lab Sample ID: JC81225-2A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.9	1.6	mg/kg	1	01/15/19 14:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A11		Date Sampled: 01/11/19
Lab Sample ID: JC81225-3A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.4	1.1	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.5	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.3	5.6	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45974

(2) Prep QC Batch: MP12061

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A11	Date Sampled: 01/11/19
Lab Sample ID: JC81225-3A	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 86.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	1.6	mg/kg	1	01/15/19 14:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A12		Date Sampled: 01/11/19
Lab Sample ID: JC81225-4A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.7	1.2	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	7.0	4.9	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	12.3	6.2	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45974

(2) Prep QC Batch: MP12061

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A12	Date Sampled: 01/11/19
Lab Sample ID: JC81225-4A	Date Received: 01/11/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.5	1.7	mg/kg	1	01/15/19 14:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A12S		Date Sampled: 01/11/19
Lab Sample ID: JC81225-5A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.7	1.1	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.2	4.4	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.9	5.6	mg/kg	1	01/11/19	01/14/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45974

(2) Prep QC Batch: MP12061

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A12S		Date Sampled: 01/11/19
Lab Sample ID: JC81225-5A		Date Received: 01/11/19
Matrix: SO - Soil		Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.3	1.6	mg/kg	1	01/15/19 14:55	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC81350, JC81419, JC81597, JC81644, and JC81681

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32952R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC81350, JC81419, JC81597, JC81644, and JC81681 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC81350	FB(20190115)-A1	JC81350-1	Water	1/15/2019		X	X	X
	BS-A0	JC81350-2	Soil	1/15/2019		X	X	X
JC81419	FB(20190116)	JC81419-1	Water	1/16/2019		X	X	X
	BS-A9V	JC81419-2	Soil	1/16/2019		X	X	X
	107_M020N(A)	JC81419-3	Soil	1/16/2019		X	X	X
JC81597	FB(20190118)	JC81597-1	Water	1/18/2019		X	X	X
	BS-A0S	JC81597-2	Soil	1/18/2019		X	X	X
JC81644	FB(20190121)-A1	JC81644-1	Water	1/21/2019		X	X	X
	BS-A14	JC81644-3	Soil	1/21/2019		X	X	X
	107-M028E2	JC81644-4	Soil	1/21/2019		X	X	X
JC81681	FB(20190122)	JC81681-1	Water	1/22/2019		X	X	X
	107-M028W	JC81681-2	Soil	1/22/2019		X	X	X
	BS-A15	JC81681-3	Soil	1/22/2019		X	X	X
	107-M030E2	JC81681-4	Soil	1/22/2019		X	X	X
	BS-A16S	JC81681-5	Soil	1/22/2019		X	X	X
	DUP-02(20190122)RR	JC81681-6	Soil	1/22/2019	107-M028W	X	X	X
	BS-A16I	JC81681-7	Soil	1/22/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC81419 and JC81681: Miscellaneous parameters for samples BS-A9V and BS-A15 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC81350, JC81419, JC81597, and JC81644: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC81681: The MS/MSD analysis performed on sample location BS-A15 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-A15	Antimony	60.8%	66.1%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC81350, JC81419, JC81597, and JC81644: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC81681: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-A15. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
107-M028W / DUP-02(20190122)RR	Chromium	18.1	19.6	8.0%
	Trivalent Chromium	17.7	19.1	7.6%
	Nickel	11.2	11.6	AC
	Vanadium	28.2	35.5	

Notes:

AC = Acceptable

The differences in the results between the parent sample 107-M028W and field duplicate sample DUP-02(20190122)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC81350, JC81419, JC81597, and JC81644: The serial dilution analysis was not performed using a sample from these SDGs.

DATA REVIEW REPORT

SDG #JC81681: The serial dilution performed on sample location BS-A15 exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC81644: The MS analysis was not performed using a sample from this SDG.

SDG #JC81597: The MS analysis performed on sample location BS-A0S in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC81350 and JC81681: The MS analysis performed on sample locations BS-A0 and BS-A15 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC81350, JC81419, JC81681: The MS analysis performed on sample locations BS-A0, BS-A9V, and BS-A15 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-A0	Hexavalent Chromium, Soluble	68.4%	AC (78.1%)
BS-A9V	Hexavalent Chromium, Soluble	< 50%	56.7%
	Hexavalent Chromium, Insoluble	AC (103%)	71.6%
BS-A15	Hexavalent Chromium, Soluble	< 50%	< 50%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC81350: The reanalysis of the field sample is usable. No qualification of the sample results was required.

SDGs #JC81419 and JC81681: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC81350, JC81419, JC81597, and JC81681: The PDS analysis performed on sample locations BS-A0, BS-A9V, BS-A0S, and BS-A15 exhibited recoveries within the control limits.

SDG #JC81644: The PDS analysis was not performed using a sample from this SDG.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC81350, JC81419, JC81597, and JC81681: The laboratory duplicate analysis performed on sample locations BS-A0, BS-A9V, BS-A0S, and BS-A15 exhibited results within the control limit.

SDG #JC81644: The laboratory duplicate analysis was not performed using a sample from this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
107-M028W / DUP-02(20190122)RR	Hexavalent Chromium	0.50 U	0.49 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample 107-M028W and field duplicate sample DUP-02(20190122)RR.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-A0S	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-A9V BS-A15	ASTM D3872-86	Analysis: 7 days	< 24 hours from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

DATA REVIEW REPORT

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC81350, JC81419, and JC81597: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC81644 and JC81681: The laboratory duplicate analysis performed on sample locations 107-M028E2 and BS-A15 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
107-M028W / DUP-02(20190122)RR	Redox Potential	263	255	3.1%
	pH	7.07	6.93	2.0%

The differences in the results between the parent sample 107-M028W and field duplicate sample DUP-02(20190122)RR were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	


Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 5, 2019

PEER REVIEW: Dennis Capria

DATE: June 27, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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FED-EX Tracking #
SGS Quote #
Lab Order Control # **115-121018-204**
SGS Job # **JC81350**

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes								
Company Name Arcadis		Project Name PPG Jersey City Site 107				Total chromium Hexavalent chromium Trivalent chromium Vanadium Thallium Antimony Nickel										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank								
Street Address 10 Friends Lane		Street 18 Chapel Avenue																						
City State Zip Newtown PA 18440		City State Jersey City NJ																						
Project Contact Matt Bell		Project # NPDD0770.0001.00008																						
Phone # 646-762-5629		Client Purchase Order # 20-742-3460																						
Sampler(s) Name(s) G. Quiñones		Project Manager Jim McLaughlin																						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vol #	Date	Time	Sampled by	Matrix	# of bottles	NCI	NIQH	HNDS	H2SO4	NO3	DI Water	MEQN	ENCORE	LAB USE ONLY								
1	FB(20190115)-A1		11/15/19	1100	GG	FB	4					2				X	X	X	X	X	X	X		A11
2	BS-A0		11/15/19	1130	GG	SO	1					1				X	X	X	X	X	X	X		G2 C39

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS <input type="checkbox"/> Other			
Emergency & Rush TIA data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				Sample inventory is verified upon receipt in the Laboratory					

Relinquished by Sampler: [Signature]		Date Time: 1-15-19 1400	Received By: [Signature]		Date Time: 1-15-19 1534	Received By: [Signature]	
Relinquished by Sampler: [Signature]		Date Time:	Received By: [Signature]		Date Time:	Received By: [Signature]	
Relinquished by: [Signature]		Date Time:	Received By: [Signature]		Date Time:	Received By: [Signature]	
		Custody Seal # 11474		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable <input type="checkbox"/> On Ice <input checked="" type="checkbox"/> Cooler Temp. 3.2 OC	



5.2
5

Report of Analysis

Client Sample ID: FB(20190115)-A1 Lab Sample ID: JC81350-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/15/19 Date Received: 01/15/19 Percent Solids: n/a
--	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/15/19 21:05	DC	SW846 7196A
Redox Potential Vs H2	290		mv	1	01/16/19 12:04	RI	ASTM D1498-76
pH ^a	5.54		su	1	01/15/19 16:00	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A0	Date Sampled: 01/15/19
Lab Sample ID: JC81350-2	Date Received: 01/15/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93	0.47	mg/kg	1	01/16/19 17:05	DC	SW846 3000A/7190A
Redox Potential Vs H2	276		mv	1	01/16/19 15:28	RI	ASTM D1498-76M
Solids, Percent	84.8		%	1	01/16/19 09:11	RC	SM2540 G 18TH ED MOD
pH	7.23		su	1	01/16/19 15:17	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A0	Date Sampled: 01/15/19
Lab Sample ID: JC81350-2R	Date Received: 01/15/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.87	0.47	mg/kg	1	01/21/19 13:04	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190115)-A1	Date Sampled: 01/15/19
Lab Sample ID: JC81350-1A	Date Received: 01/15/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45992

(2) Prep QC Batch: MP12103

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190115)-A1	Date Sampled: 01/15/19
Lab Sample ID: JC81350-1A	Date Received: 01/15/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/16/19 15:11	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A0		Date Sampled: 01/15/19
Lab Sample ID: JC81350-2A		Date Received: 01/15/19
Matrix: SO - Soil		Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.0	1.2	mg/kg	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.6	4.6	mg/kg	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	5.8	mg/kg	1	01/15/19	01/16/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA45992

(2) Prep QC Batch: MP12101

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A0	Date Sampled: 01/15/19
Lab Sample ID: JC81350-2A	Date Received: 01/15/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.1	1.7	mg/kg	1	01/16/19 17:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



50
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AK-121018-205
JC81419

Client / Reporting Information		Project Information												Requested Analysis								Matrix Codes									
Company Name Arcadis 10 Friends Lane, Suite 200 Newtown, PA 18440		Project Name PPG Site 107 (Jersey City) Street 18 Chapel Avenue City Jersey City State NJ												Total Chromium Hexavalent Chromium Trivalent Chromium Arsimony Nickel Thallium Vanadium								FW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SD - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WPT - Wipes FB - Field Blank EB - Equipment Blank IB - In-line Blank TB - Trip Blank									
Project Contact Matthew Bell E-mail S10.756.7080 Sampler(s) Name(s) C Buchanan		Project # NPO00770.0001 Client Purchase Order # Project Manager Jim McLaughlin, Jr. Attention:																													
Field ID / Point of Collection		Collection		Number of preserved bottles												LAB USE ONLY															
FB(20190116)		MECH/DI Val #		Date	Time	Sampled By	QAC (I)	QAC (C)	Metric	# of bottles	HO	MO	SO	DO	NO ₃	NO ₂	NO ₃ -N	NO ₂ -N	DO	WATER	ENCLOSURE	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Arsimony	Nickel	Thallium	Vanadium	LAB USE ONLY		
BS-A9V				1/16/18	1030	CC	G	FB	4	1					1							X	X	X	X	X	X	X	A12		
107_M020N(A)				1/16/18	1300	CC	G	SO	1						1							X	X	X	X	X	X	X	650		
M020_N(2)				1/16/18	1115	CC	G	SO	1						1							X	X	X	X	X	X	X			
BS-A2T				1/16/18	1315	CC	G	SO	1						1							X	X	X	X	X	X	X	C4		
HOLD BS-A1T and BS-A2T				1/16/18	1330	CC	G	SO	1						1							X	X	X	X	X	X	X			
Turn Around Time (Business Days)				Deliverable												Comments / Special Instructions															
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other				Approved By (2025 PM) / Date: _____				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DRGP				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT MCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equib_				<input type="checkbox"/> OGD-GISMS				Sample Custody must be documented below each time samples change possession, including courier delivery. Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions											
Relinquished By:		Date / Time:		Received By:		Date / Time:		Relinquished By:		Date / Time:		Received By:		Date / Time:		Relinquished By:		Date / Time:		Received By:		Date / Time:		Relinquished By:		Date / Time:		Received By:			
1				3		SGS COURIER		2		1/16/18 1701		SGS COURIER		2																	
3				3				4																							
5				5				5																							

INITIAL ASSESSMENT: 3A/JH
LABEL VERIFICATION: _____

SGS Post Ex Sample COC Template 2018/10/20

JC81419: Chain of Custody

Page 1 of 5



Report of Analysis

Client Sample ID: FB(20190116)	Date Sampled: 01/16/19
Lab Sample ID: JC81419-1	Date Received: 01/16/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/16/19 22:45	LS	SW846 7196A
Redox Potential Vs H2	341		mv	1	01/17/19 14:39	EB	ASTM D1498-76
pH ^a	4.24		su	1	01/16/19 17:10	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A9V	Date Sampled: 01/16/19
Lab Sample ID: JC81419-2	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 J-	0.49	mg/kg	1	01/17/19 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	01/17/19 12:50	EB	ASTM D1498-76M
Solids, Percent	81		%	1	01/17/19 09:00	RC	SM2540 G 18TH ED MOD
pH	7.09		su	1	01/17/19 09:58	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_M020N(A)	Date Sampled: 01/16/19
Lab Sample ID: JC81419-3	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.47	mg/kg	1	01/17/19 16:53	DC	SW846 3060A/7196A
Redox Potential Vs H2	276		mv	1	01/17/19 12:53	EB	ASTM D1498-76M
Solids, Percent	84.3		%	1	01/17/19 09:00	RC	SM2540 G 18TH ED MOD
pH	8.14		su	1	01/17/19 10:02	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A9V	Date Sampled: 01/16/19
Lab Sample ID: JC81419-2R	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	01/21/19 15:05	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A9V		Date Sampled: 01/16/19
Lab Sample ID: JC81419-2RT		Date Received: 01/16/19
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.56 J	0.20	%	1	01/23/19 13:10	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	01/23/19 13:10	MP	SM4500S2- A-11
Total Organic Carbon	1780	120	mg/kg	1	01/25/19 22:58	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_M020N(A)	Date Sampled: 01/16/19
Lab Sample ID: JC81419-3R	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.47	mg/kg	1	01/21/19 15:06	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190116) Lab Sample ID: JC81419-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/16/19 Date Received: 01/16/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/17/19	01/17/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/17/19	01/17/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/17/19	01/17/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/17/19	01/17/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/17/19	01/17/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA45999

(2) Prep QC Batch: MP12109

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190116)	Date Sampled: 01/16/19
Lab Sample ID: JC81419-1A	Date Received: 01/16/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/17/19 15:50	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A9V	Date Sampled: 01/16/19
Lab Sample ID: JC81419-2A	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/17/19	01/17/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	78.3	1.2	mg/kg	1	01/17/19	01/17/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.5	4.7	mg/kg	1	01/17/19	01/17/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/17/19	01/17/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	5.9	mg/kg	1	01/17/19	01/17/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46001

(2) Prep QC Batch: MP12125

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A9V	Date Sampled: 01/16/19
Lab Sample ID: JC81419-2A	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	75.9	1.7	mg/kg	1	01/17/19 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_M020N(A) Lab Sample ID: JC81419-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/16/19 Date Received: 01/16/19 Percent Solids: 84.3
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/17/19	01/17/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.5	1.2	mg/kg	1	01/17/19	01/17/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.0	4.7	mg/kg	1	01/17/19	01/17/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/17/19	01/17/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	5.9	mg/kg	1	01/17/19	01/17/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46001

(2) Prep QC Batch: MP12125

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_M020N(A)	Date Sampled: 01/16/19
Lab Sample ID: JC81419-3A	Date Received: 01/16/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.9	1.7	mg/kg	1	01/17/19 16:53	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: 18440 Project Contact: Matthew Bell E-mail: Phone #: 610.755.7080 Samples Name(s): C Cifelli		Project Information Project Name: 000 site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Project #: NP000770.0001 Project Manager: Jim McLaughlin, Jr.		Requested Analysis Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank											
Collection Field ID / Point of Collection: FB(20190119) Date: 1/18/19 Time: 1350 Method: CC Operator: G Name: FB # of bottles: 2 Matrix: SO		Number of preserved bottles TOC: 1 H2O: 1 NH4-N: 1 NO3-N: 1 NO2-N: 1 Cu: 1 Pb: 1 Zn: 1 Cd: 1 Cr: 1 Ni: 1 Mn: 1 Fe: 1 Al: 1 Se: 1 As: 1 Hg: 1 Ag: 1 Ba: 1 Be: 1 Bi: 1 Br: 1 B: 1 Ca: 1 Cl: 1 Co: 1 Cr: 1 Cs: 1 D: 1 F: 1 Ga: 1 Ge: 1 In: 1 K: 1 Li: 1 Mg: 1 Mo: 1 Na: 1 Ni: 1 N: 1 O: 1 P: 1 Rb: 1 S: 1 Se: 1 Si: 1 Sr: 1 Tl: 1 U: 1 V: 1 W: 1 Y: 1 Zn: 1													
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: _____		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equib...										Comments / Special Instructions A12 G26 D12	
Signature / Date 1/18/19		Signature / Date 1/18/19		Signature / Date 1/18/19		Signature / Date 1/18/19		Signature / Date 1/18/19		Signature / Date 1/18/19					

5.2
5

INITIAL ASSESSMENT JR ZB
LABEL VERIFICATION

Report of Analysis

Client Sample ID: FB(20190118)	Date Sampled: 01/18/19
Lab Sample ID: JC81597-1	Date Received: 01/18/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/18/19 19:40	DC	SW846 7196A
Redox Potential Vs H2	356		mv	1	01/21/19 16:33	EB	ASTM D1498-76
pH ^a	6.09		su	1	01/18/19 17:07	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A0S	Date Sampled: 01/18/19
Lab Sample ID: JC81597-2	Date Received: 01/18/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.46	mg/kg	1	01/22/19 15:28	DC	SW846 3060A/7196A
Redox Potential Vs H2	260		mv	1	01/21/19 12:36	EB	ASTM D1498-76M
Solids, Percent	87.1		%	1	01/21/19 08:43	RC	SM2540 G 18TH ED MOD
pH	7.74 J		su	1	01/21/19 11:53	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190118) Lab Sample ID: JC81597-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/18/19 Date Received: 01/18/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/19/19	01/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/19/19	01/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/19/19	01/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/19/19	01/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/19/19	01/21/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46015

(2) Prep QC Batch: MP12177

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190118)	Date Sampled: 01/18/19
Lab Sample ID: JC81597-1A	Date Received: 01/18/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/21/19 15:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A0S		Date Sampled: 01/18/19
Lab Sample ID: JC81597-2A		Date Received: 01/18/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/19/19	01/21/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.0	1.1	mg/kg	1	01/19/19	01/21/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.4	4.5	mg/kg	1	01/19/19	01/21/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	01/19/19	01/21/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	43.1	5.6	mg/kg	1	01/19/19	01/21/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46015

(2) Prep QC Batch: MP12179

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A0S		Date Sampled: 01/18/19
Lab Sample ID: JC81597-2A		Date Received: 01/18/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.2
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.9	1.6	mg/kg	1	01/22/19 15:28	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



50
FB

CHAIN OF CUSTODY

SGS North America Inc. Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 782-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Box Order Control #
SGS Quote #	SGS Job #
	AK - 121018-208
	3C81644

Client / Reporting Information			Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes																																																																																																		
Company Name ARCADIS			Project Name PPG SITE 107 (Jersey City)				<table border="1"> <tr><td>TOTAL CHROMIUM</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>HEXAVALENT CHROMIUM</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>TRIVALENT CHROMIUM</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>ANTIMONY</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>NICKEL</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>THALLIUM</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>VANADIUM</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										TOTAL CHROMIUM														HEXAVALENT CHROMIUM														TRIVALENT CHROMIUM														ANTIMONY														NICKEL														THALLIUM														VANADIUM														CW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
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Turnaround Time (Business days)			Data Deliverable Information										Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____			Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULL T1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary</small>										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS <input type="checkbox"/> Other _____	INITIAL ASSESSMENT HL3A LABEL VERIFICATION _____

Sample Custody must be documented below each time samples change possession, including courier delivery.							
Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:	Relinquished By:	Date Time:
1	01/21/19/1430	[Signature]	2	1.2.19	[Signature]	3	1.2.19
2			4			5	
3							
4							
5							



Report of Analysis

Client Sample ID: FB(20190121)-A1	Date Sampled: 01/21/19
Lab Sample ID: JC81644-1	Date Received: 01/21/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/21/19 17:08	JO	SW846 7196A
Redox Potential Vs H2	287		mv	1	01/22/19 13:15	RI	ASTM D1498-76
pH ^a	6.42		su	1	01/21/19 16:38	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A14	Date Sampled: 01/21/19
Lab Sample ID: JC81644-3	Date Received: 01/21/19
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	01/22/19 16:44	RI	SW846 3060A/7196A
Redox Potential Vs H2	290		mv	1	01/22/19 13:44	RI	ASTM D1498-76M
Solids, Percent	84.1		%	1	01/22/19 08:45	EB	SM2540 G 18TH ED MOD
pH	7.40		su	1	01/22/19 13:34	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107-M028E2	Date Sampled: 01/21/19
Lab Sample ID: JC81644-4	Date Received: 01/21/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54	0.45	mg/kg	1	01/22/19 16:44	RI	SW846 3060A/7196A
Redox Potential Vs H2	300		mv	1	01/22/19 13:34	RI	ASTM D1498-76M
Solids, Percent	88.6		%	1	01/22/19 08:45	EB	SM2540 G 18TH ED MOD
pH	7.67		su	1	01/22/19 13:28	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190121)-A1 Lab Sample ID: JC81644-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/21/19 Date Received: 01/21/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46022

(2) Prep QC Batch: MP12199

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190121)-A1 Lab Sample ID: JC81644-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/21/19 Date Received: 01/21/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/22/19 12:39	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A14		Date Sampled: 01/21/19
Lab Sample ID: JC81644-3A		Date Received: 01/21/19
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	01/21/19	01/22/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	14.3	1.2	mg/kg	1	01/21/19	01/22/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	11.4	5.0	mg/kg	1	01/21/19	01/22/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/21/19	01/22/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	20.8	6.2	mg/kg	1	01/21/19	01/22/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46022

(2) Prep QC Batch: MP12179

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A14	Date Sampled: 01/21/19
Lab Sample ID: JC81644-3A	Date Received: 01/21/19
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.9	1.7	mg/kg	1	01/22/19 16:44	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107-M028E2	Date Sampled: 01/21/19
Lab Sample ID: JC81644-4A	Date Received: 01/21/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	16.6	1.1	mg/kg	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.6	4.6	mg/kg	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.5	5.7	mg/kg	1	01/21/19	01/22/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46022

(2) Prep QC Batch: MP12179

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107-M028E2	Date Sampled: 01/21/19
Lab Sample ID: JC81644-4A	Date Received: 01/21/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.1	1.6	mg/kg	1	01/22/19 16:44	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SD
CB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Control #
SGS Quote #	SGS Job #
	AK-12108-211
	JC 81081

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes
Company Name Arcaadis		Project Name PPG Site 107 Jersey City										Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Avenue																	
City Newtown PA		City Jersey City NJ																	
Project Contact Matt Bell		Project # NP000770.0001.00008																	
Phone # 646.762.5629		Client Purchase Order #																	
Fax #		City																	
State		State																	
Zip		Zip																	
Sampler(s) Name(s) Cynthia Buckman, Chelsea Cofelli		Project Manager Jim McLaughlin										Attention:	Matrix Codes						
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	HNO3	H2SO4	NONE	DI Water	MEDIH	ENCORE	LAB USE ONLY				
1	FB(20190122)		1/22/19	1230	CC	FB	2								D63				
2	107-M02AW		1/22/19	1130	CB	SO	1								A18				
	BS-A15		1/22/19	1155	CB	SO	1								G3				
3	BS-A15MS		1/22/19	1155	CB	SO	1												
	BS-A15MSD		1/22/19	1155	CB	SO	1												
4	107-M030E2		1/22/19	1200	CB	SO	1												
5	BS-A16S		1/22/19	1205	CB	SO	1												
6	DUR02(20190122)RR		1/22/19	-	CB	SO	1												
7	BS-A16I		1/22/19	1245	CB	SO	1												
Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions							
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Equis</i> <input type="checkbox"/> Other Sample inventory is verified upon receipt in the Laboratory							
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										157							
1	Relinquished by Sampler <i>John</i>	Date Time 1/22/19 1412	Received By 1 Robert Chambers	Date Time 1/22/19	Relinquished By 2 Robert Chambers	Date Time 1/22/19	Received By 2												
3	Relinquished by Sampler	Date Time	Received By 3	Date Time	Relinquished By 4	Date Time	Received By 4												
5	Relinquished by	Date Time	Received By 5	Date Time	Custody Seal # 19706	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact Preserved where applicable On Ice Cooler Temp. 20C													



5.2
5

Report of Analysis

Client Sample ID: FB(20190122) Lab Sample ID: JC81681-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/22/19 Date Received: 01/22/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/22/19 20:55	LS	SW846 7196A
Redox Potential Vs H2	266		mv	1	01/23/19 14:50	RB	ASTM D1498-76
pH ^a	5.33		su	1	01/22/19 15:40	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107-M028W	Date Sampled: 01/22/19
Lab Sample ID: JC81681-2	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	01/23/19 15:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	01/23/19 16:09	RB	ASTM D1498-76M
Solids, Percent	80.8		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	7.07		su	1	01/23/19 15:33	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A15	Date Sampled: 01/22/19
Lab Sample ID: JC81681-3	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	01/23/19 15:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	258		mv	1	01/23/19 16:19	RB	ASTM D1498-76M
Solids, Percent	84.5		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	7.36		su	1	01/23/19 15:35	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107-M030E2	Date Sampled: 01/22/19
Lab Sample ID: JC81681-4	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.53	mg/kg	1	01/23/19 15:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	256		mv	1	01/23/19 16:25	RB	ASTM D1498-76M
Solids, Percent	75.3		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	7.18		su	1	01/23/19 16:09	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A16S	Date Sampled: 01/22/19
Lab Sample ID: JC81681-5	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	01/23/19 15:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	256		mv	1	01/23/19 16:30	RB	ASTM D1498-76M
Solids, Percent	77.9		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	7.11		su	1	01/23/19 16:15	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-02(20190122)RR	Date Sampled: 01/22/19
Lab Sample ID: JC81681-6	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	01/23/19 15:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	255		mv	1	01/23/19 16:31	RB	ASTM D1498-76M
Solids, Percent	81.8		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	6.93		su	1	01/23/19 16:26	RB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A16I	Date Sampled: 01/22/19
Lab Sample ID: JC81681-7	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99 J-	0.47	mg/kg	1	01/23/19 15:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	254		mv	1	01/23/19 16:41	RB	ASTM D1498-76M
Solids, Percent	86		%	1	01/23/19 08:40	EB	SM2540 G 18TH ED MOD
pH	7.45		su	1	01/23/19 16:30	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 107-M028W	Date Sampled: 01/22/19
Lab Sample ID: JC81681-2R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.70	0.50	mg/kg	1	01/25/19 17:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A15	Date Sampled: 01/22/19
Lab Sample ID: JC81681-3R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	01/25/19 17:30	DC	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A15	Date Sampled: 01/22/19
Lab Sample ID: JC81681-3RT	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous	0.76 J	0.20	%	1	01/29/19 11:30	ST	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	01/29/19	ST	SM4500S2- A-11
Total Organic Carbon	1730	120	mg/kg	1	01/28/19 20:54	CD	LLOYD KAHN 1988 MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107-M030E2	Date Sampled: 01/22/19
Lab Sample ID: JC81681-4R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.53	mg/kg	1	01/25/19 17:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A16S	Date Sampled: 01/22/19
Lab Sample ID: JC81681-5R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76	0.51	mg/kg	1	01/25/19 17:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-02(20190122)RR	Date Sampled: 01/22/19
Lab Sample ID: JC81681-6R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63	0.49	mg/kg	1	01/25/19 17:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A16I	Date Sampled: 01/22/19
Lab Sample ID: JC81681-7R	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	01/25/19 17:35	DC	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190122)		Date Sampled: 01/22/19
Lab Sample ID: JC81681-1A		Date Received: 01/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/23/19	01/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/23/19	01/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/23/19	01/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/23/19	01/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/23/19	01/23/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46026

(2) Prep QC Batch: MP12223

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190122)		Date Sampled: 01/22/19
Lab Sample ID: JC81681-1A		Date Received: 01/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/23/19 16:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107-M028W	Date Sampled: 01/22/19
Lab Sample ID: JC81681-2A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.1	1.3	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.2	5.1	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.2	6.3	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107-M028W	Date Sampled: 01/22/19
Lab Sample ID: JC81681-2A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.8	mg/kg	1	01/23/19 22:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A15	Date Sampled: 01/22/19
Lab Sample ID: JC81681-3A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.9	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.9	4.8	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	6.0	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A15	Date Sampled: 01/22/19
Lab Sample ID: JC81681-3A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 84.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.7	mg/kg	1	01/23/19 21:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107-M030E2	Date Sampled: 01/22/19
Lab Sample ID: JC81681-4A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	01/22/19	01/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.0	1.4	mg/kg	1	01/22/19	01/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	5.5	mg/kg	1	01/22/19	01/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	01/22/19	01/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	6.9	mg/kg	1	01/22/19	01/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 107-M030E2		Date Sampled: 01/22/19
Lab Sample ID: JC81681-4A		Date Received: 01/22/19
Matrix: SO - Soil		Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.0	1.9	mg/kg	1	01/23/19 22:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A16S	Date Sampled: 01/22/19
Lab Sample ID: JC81681-5A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.7	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.6	4.9	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.6	6.1	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A16S		Date Sampled: 01/22/19
Lab Sample ID: JC81681-5A		Date Received: 01/22/19
Matrix: SO - Soil		Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.3	1.7	mg/kg	1	01/23/19 22:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-02(20190122)RR Lab Sample ID: JC81681-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/22/19 Date Received: 01/22/19 Percent Solids: 81.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	19.6	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.6	4.8	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.5	6.0	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-02(20190122)RR	Date Sampled: 01/22/19
Lab Sample ID: JC81681-6A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.1	1.7	mg/kg	1	01/23/19 22:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A16I	Date Sampled: 01/22/19
Lab Sample ID: JC81681-7A	Date Received: 01/22/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.3	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	4.7	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.1	5.8	mg/kg	1	01/22/19	01/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46027

(2) Prep QC Batch: MP12220

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-A16I		Date Sampled: 01/22/19
Lab Sample ID: JC81681-7A		Date Received: 01/22/19
Matrix: SO - Soil		Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.3	1.7	mg/kg	1	01/23/19 22:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC81743 and JC81864

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32953R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC81743 and JC81864 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC81743	FB(20190123)	JC81743-1	Water	1/23/2019		X	X	X
	SW-A0 (8.0-8.5)	JC81743-2	Soil	1/23/2019		X	X	X
	BS-A0T	JC81743-3	Soil	1/23/2019		X	X	X
	BS-A1T	JC81743-4	Soil	1/23/2019		X	X	X
	BS-A2T	JC81743-5	Soil	1/23/2019		X	X	X
	BS-A1	JC81743-6	Soil	1/23/2019		X	X	X
	BS-A2	JC81743-7	Soil	1/23/2019		X	X	X
	SW-A11 (8.0-8.5)	JC81743-8	Soil	1/23/2019		X	X	X
	SW-A10 (8.0-8.5)	JC81743-9	Soil	1/23/2019		X	X	X
	SW-A11 (6.0-6.5)	JC81743-10	Soil	1/23/2019		X	X	X
	SW-A10 (6.0-6.5)	JC81742-11	Soil	1/23/2019		X	X	X
	BS-A3D	JC81743-12	Soil	1/23/2019		X	X	X
	BS-A3S	JC81743-13	Soil	1/23/2019		X	X	X
	BS-A3T	JC81743-14	Soil	1/23/2019		X	X	X
JC81864	FB(20190125)	JC81864-1	Water	1/25/2019		X	X	X
	BS-A18	JC81864-2	Soil	1/25/2019		X	X	X
	BS-A19	JC81864-3	Soil	1/25/2019		X	X	X
	BS-A17	JC81864-4	Soil	1/25/2019		X	X	X
	108_M016_1	JC81864-5	Soil	1/25/2019		X	X	X
	107_M034N	JC81864-6	Soil	1/25/2019		X	X	X
	108_M018N_1	JC81864-7	Soil	1/25/2019		X	X	X
	108_M018N	JC81864-8	Soil	1/25/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).

DATA REVIEW REPORT

2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

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ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Method (SM) 4500H+B; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample locations BS-A3T and BS-A18 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-A3T	Antimony	59.6%	64.1%
BS-A18	Antimony	70.4%	73.5%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

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MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-A3T and BS-A18. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample locations BS-A3T and BS-A18 exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC81743: The MS analysis performed on sample location BS-A3T in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC81864: The MS analysis performed on sample location BS-A18 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC81864: The MS analysis performed on sample location BS-A18 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-A18	Hexavalent Chromium, Soluble	68.4%	AC (91.8%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC81864: The reanalysis of the field sample is usable. No qualification of the sample results was required.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations BS-A3T and BS-A18 exhibited recoveries within the control limits.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-A3T and BS-A18 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-A18 BS-A19 BS-A17 108_M016_1 107_M034N 108_M018N_1 108_M018N	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The

DATA REVIEW REPORT

BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations BS-A3T and BS-A18 exhibited results within the control limit.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate samples were not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks	X				X
C. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R	X				X
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	


Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 5, 2019

PEER REVIEW: Dennis Capria

DATE: June 27, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes																																																																																				
Company Name Arcadis		Project Name PPG Site 107 Jersey City				<table border="1"> <tr><td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium											Vanadium																																																																																				
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Street Address 10 Friends Lane Suite 200		Street 18 Chapel Ave.																																																																																																		
City Newtown PA 18440		City Jersey City NJ																																																																																																		
Project Contact Matt Bell		Project # NC000770.0001.0000B																																																																																																		
Phone # 646.762.5629		Client Purchase Order #																																																																																																		
Sampler(s) Name(s) Christina Cifelli		Project Manager Jim McLaughlin																																																																																																		
Lab Sample #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HPC	NASH	HMDD	HPSDA	NONE	DI Water	MEDH	ENCORE	LAB USE ONLY																																																																																				
1	FB(20190123)		1/23/19	1130	CC	EB	2									A20																																																																																				
2	SW-A0(8.0-8.5)		1/23/19	0845	CC	SO	1									G10																																																																																				
3	BS-A0T		1/23/19	0900	CC	SO	1									D40																																																																																				
4	BS-A1T		1/23/19	0910	CC	SO	1																																																																																													
5	BS-A2T		1/23/19	0920	CC	SO	1																																																																																													
6	BS-A1S		1/23/19	0930	CC	SO	1																																																																																													
7	BS-A2S		1/23/19	0940	CC	SO	1																																																																																													
8	SW-11(8.0-8.5)		1/23/19	0950	CC	SO	1																																																																																													
9	SW-10(8.0-8.5)		1/23/19	1000	CC	SO	1																																																																																													
10	SW-11(6.0-6.5)		1/23/19	1230	CC	SO	1																																																																																													
11	SW-10(6.0-6.5)		1/23/19	1300	CC	SO	1																																																																																													
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:				Data Deliverable Information										Comments / Special Instructions																																																																																				
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format <i>Equl</i> <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting										INITIAL ASSESSMENT 3B LABEL VERIFICATION																																																																																				
Emergency & Rush T/A data available via LabLink						Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										Sample inventory is verified upon receipt in the Laboratory																																																																																				
Sample Custody must be documented below each time samples change possession, including courier delivery.																																																																																																				
Relinquished by: 2	Date Time: 1/23/19 1430	Received By: 1 Robert Chaussees	Date Time: 1/23/19 1610	Relinquished by: 2 Robert Chaussees	Date Time: 1/23/19 1610	Received By: 2	Date Time: 1/23/19 1610	Relinquished by: 3	Date Time: 1/23/19 1610	Received By: 4	Date Time: 1/23/19 1610	Relinquished by: 4	Date Time: 1/23/19 1610	Received By: 5	Date Time: 1/23/19 1610	Relinquished by: 5	Date Time: 1/23/19 1610																																																																																			
Custody Seal # 14168	<input type="checkbox"/> Intact	<input type="checkbox"/> Not intact	Preserved where applicable	<input type="checkbox"/> On Ice	<input checked="" type="checkbox"/> Cooler Temp	3.7°C																																																																																														

5.2
5





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC81743

Company Name: Arcadis
Project Name: PPG Site 107 Jersey City
Street Address: 10 Francis Lane
City: Newark, State: NJ, Zip: 07102
Project Contact: Matt Boldt
Project # NJ7701.8
Client Purchase Order #
Matrix Codes: Total Chromium, Hexavalent Chromium, Trivalent Chromium, Antimony, Nickel, Thallium, Vanadium

Table with columns: Lab Sample #, Field ID / Point of Collection, MEQH/DI Viol #, Date, Time, Sampled by, Matrix, # of bottles, and various chemical analysis columns (Pb, Cu, Ni, etc.). Rows 12-14 show data for BS-A3D, BS-A3S, and BS-A3T.

Turnaround Time (Business days)
Approved by (SGS Project Manager)/Date:
Commercial "A" (Level 1)
Commercial "B" (Level 2)
FULLT1 (Level 3+4)
NJ Reduced
Commercial "C"
NJ Date of Known Quality Protocol Reporting
Sample inventory is verified upon receipt in the Laboratory

Chain of custody table with columns: Relinquished by, Date Time, Received By, Date Time, Relinquished By, Date Time, Received By, Date Time. Includes handwritten signatures and dates.

Report of Analysis

Client Sample ID: FB (20190123)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-1	Date Received: 01/23/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/23/19 22:28	LS	SW846 7196A
Redox Potential Vs H2	330		mv	1	01/24/19 10:20	RI	ASTM D1498-76
pH ^a	5.70		su	1	01/23/19 16:20	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A0 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-2	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.77	0.55	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	01/24/19 11:56	RI	ASTM D1498-76M
Solids, Percent	72.4		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.12		su	1	01/24/19 11:47	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A0T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-3	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.47	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	01/24/19 12:02	RI	ASTM D1498-76M
Solids, Percent	85		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.64		su	1	01/24/19 11:50	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A1T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-4	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.56	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	01/24/19 12:07	RI	ASTM D1498-76M
Solids, Percent	71.6		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.63		su	1	01/24/19 11:57	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A2T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-5	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	01/24/19 12:11	RI	ASTM D1498-76M
Solids, Percent	88.2		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	7.20		su	1	01/24/19 12:02	RI	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A1	Date Sampled: 01/23/19
Lab Sample ID: JC81743-6	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64	0.44	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	01/24/19 12:14	RI	ASTM D1498-76M
Solids, Percent	89.9		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	8.35		su	1	01/24/19 12:07	RI	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A2	Date Sampled: 01/23/19
Lab Sample ID: JC81743-7	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	01/24/19 12:19	RI	ASTM D1498-76M
Solids, Percent	90.3		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	8.24		su	1	01/24/19 12:11	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A11 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-8	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.95	0.47	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	289		mv	1	01/24/19 12:25	RI	ASTM D1498-76M
Solids, Percent	84.6		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.74		su	1	01/24/19 12:14	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A10 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-9	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.46	0.45	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	01/24/19 12:37	RI	ASTM D1498-76M
Solids, Percent	89.7		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	7.72		su	1	01/24/19 12:20	RI	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A11 (6.0-6.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-10	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	01/24/19 12:46	RI	ASTM D1498-76M
Solids, Percent	87.1		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.87		su	1	01/24/19 12:41	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10 (6.0-6.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-11	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 88.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	01/25/19 13:46	DC	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	01/24/19 13:10	RI	ASTM D1498-76M
Solids, Percent	88.4		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	7.68		su	1	01/24/19 12:44	RI	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: BS-A3D	Date Sampled: 01/23/19
Lab Sample ID: JC81743-12	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84	0.49	mg/kg	1	01/25/19 13:48	DC	SW846 3060A/7196A
Redox Potential Vs H2	261		mv	1	01/24/19 13:12	RI	ASTM D1498-76M
Solids, Percent	81.2		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	6.32		su	1	01/24/19 12:46	RI	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: BS-A3S	Date Sampled: 01/23/19
Lab Sample ID: JC81743-13	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.45	mg/kg	1	01/25/19 13:48	DC	SW846 3060A/7196A
Redox Potential Vs H2	260		mv	1	01/24/19 13:17	RI	ASTM D1498-76M
Solids, Percent	89.7		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	7.73		su	1	01/24/19 13:09	RI	SW846 9045D

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: BS-A3T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-14	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 90.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63	0.44	mg/kg	1	01/25/19 13:38	DC	SW846 3060A/7196A
Redox Potential Vs H2	302		mv	1	01/24/19 11:43	RI	ASTM D1498-76M
Solids, Percent	90.6		%	1	01/24/19 09:30	EB	SM2540 G 18TH ED MOD
pH	8.04		su	1	01/24/19 11:43	RI	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: FB (20190123) Lab Sample ID: JC81743-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/23/19 Date Received: 01/23/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46035

(2) Prep QC Batch: MP12239

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20190123)		Date Sampled: 01/23/19
Lab Sample ID: JC81743-1A		Date Received: 01/23/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/24/19 21:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A0 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-2A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.0	1.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	44.1	5.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	30.6	6.6	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A0 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-2A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.2	1.9	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A0T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-3A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.2	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.8	4.6	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.6	5.7	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A0T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-3A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A1T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-4A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.8	1.4	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.7	5.4	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.7	6.8	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A1T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-4A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	2.0	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A2T	Date Sampled: 01/23/19
Lab Sample ID: JC81743-5A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.6	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.4	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	5.5	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A2T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-5A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A1		Date Sampled: 01/23/19
Lab Sample ID: JC81743-6A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.3	1.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.8	4.7	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.1	5.9	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A1		Date Sampled: 01/23/19
Lab Sample ID: JC81743-6A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-A2		Date Sampled: 01/23/19
Lab Sample ID: JC81743-7A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.1	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.7	4.4	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.9	5.5	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-A2		Date Sampled: 01/23/19
Lab Sample ID: JC81743-7A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.9	1.5	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A11 (8.0-8.5) Lab Sample ID: JC81743-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/23/19 Date Received: 01/23/19 Percent Solids: 84.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	21.8	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.4	4.5	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	32.1	5.6	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A11 (8.0-8.5)		Date Sampled: 01/23/19
Lab Sample ID: JC81743-8A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 84.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.9	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A10 (8.0-8.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-9A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.6	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.2	4.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.9	5.4	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10 (8.0-8.5)		Date Sampled: 01/23/19
Lab Sample ID: JC81743-9A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.1	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A11 (6.0-6.5) Lab Sample ID: JC81743-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/23/19 Date Received: 01/23/19 Percent Solids: 87.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.0	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.1	4.5	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.6	5.7	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A11 (6.0-6.5)	Date Sampled: 01/23/19
Lab Sample ID: JC81743-10A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.0	1.6	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10 (6.0-6.5) Lab Sample ID: JC81743-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/23/19 Date Received: 01/23/19 Percent Solids: 88.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.6	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.6	5.8	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A10 (6.0-6.5) Lab Sample ID: JC81743-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/23/19 Date Received: 01/23/19 Percent Solids: 88.4
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.3	1.7	mg/kg	1	01/25/19 13:46	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: BS-A3D		Date Sampled: 01/23/19
Lab Sample ID: JC81743-12A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	66.4	1.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	24.7	5.0	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.3	6.3	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: BS-A3D	Date Sampled: 01/23/19
Lab Sample ID: JC81743-12A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	65.6	1.8	mg/kg	1	01/25/19 13:48	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A3S		Date Sampled: 01/23/19
Lab Sample ID: JC81743-13A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	69.5	1.2	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.7	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	5.9	mg/kg	1	01/23/19	01/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A3S	Date Sampled: 01/23/19
Lab Sample ID: JC81743-13A	Date Received: 01/23/19
Matrix: SO - Soil	Percent Solids: 89.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	66.9	1.7	mg/kg	1	01/25/19 13:48	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A3T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-14A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 90.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.9	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.5	4.4	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	5.5	mg/kg	1	01/23/19	01/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46034

(2) Prep QC Batch: MP12248

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: BS-A3T		Date Sampled: 01/23/19
Lab Sample ID: JC81743-14A		Date Received: 01/23/19
Matrix: SO - Soil		Percent Solids: 90.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.3	1.5	mg/kg	1	01/25/19 13:38	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.14
4

50
FB

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC81864

Client / Reporting Information		Project Information						Requested Analysis (see TEST CODE sheet)										Matrix Codes
Company Name: Arcadis		Project Name: PPG Jersey City Site 107						Total Chromium Hexavalent Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium										Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane Suite 200, Newark PA 19440		Street: 18 Chapel Ave, Jersey City NJ																
City/State/Zip: Newark PA 19440		City/State/Zip: Jersey City NJ																
Project Contact: Matt Bell (646.742.5629)		Project #: NJ1000770.0001.00008																
Billing Information (if different from Report to):		Company Name:						LAB USE ONLY										
Project Manager: Christina Cifelli		Attention:																
Turnaround Time (Business days):		Data Deliverable Information						Comments / Special Instructions										
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other: Equus		INITIAL ASSESSMENT <u>3BTR</u> LABEL VERIFICATION _____				
Emergency & Rush T/A data available via LabLink		NJ Reduced = Results + QC Summary + Partial Raw data						Sample inventory is verified upon receipt in the Laboratory										
Relinquished by Sampler: [Signature] Date Time: 1/25/19 14:29		Received By: [Signature]						Relinquished by: [Signature] Date Time: 1-25-19				Received By: [Signature]						
Relinquished by Sampler: [Signature] Date Time:		Received By: [Signature]						Relinquished by: [Signature] Date Time:				Received By: [Signature]						
Relinquished by: [Signature] Date Time:		Received By: [Signature]						Custody Seal # 31042 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact				Preserved where applicable On Ice <input checked="" type="checkbox"/> Cooler Temp. 3.2°C						

5.2
5

Report of Analysis

Client Sample ID: FB(20190125)	Date Sampled: 01/25/19
Lab Sample ID: JC81864-1	Date Received: 01/25/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/25/19 18:28	DC	SW846 7196A
Redox Potential Vs H2	372		mv	1	01/27/19 15:10	RB	ASTM D1498-76
pH ^a	5.36		su	1	01/25/19 16:36	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A18	Date Sampled: 01/25/19
Lab Sample ID: JC81864-2	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89	0.45	mg/kg	1	01/28/19 14:58	DC	SW846 3060A/7196A
Redox Potential Vs H2	326		mv	1	01/27/19 08:52	RB	ASTM D1498-76M
Solids, Percent	88.1		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	7.71 J		su	1	01/27/19 09:55	RB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A19	Date Sampled: 01/25/19
Lab Sample ID: JC81864-3	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63	0.46	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	323		mv	1	01/27/19 08:55	RB	ASTM D1498-76M
Solids, Percent	87.1		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	7.80 J		su	1	01/27/19 09:59	RB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A17	Date Sampled: 01/25/19
Lab Sample ID: JC81864-4	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	01/27/19 08:57	RB	ASTM D1498-76M
Solids, Percent	79		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	7.27 J		su	1	01/27/19 10:12	RB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M016_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-5	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4	0.48	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	304		mv	1	01/27/19 09:01	RB	ASTM D1498-76M
Solids, Percent	83.9		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	7.97 J		su	1	01/27/19 10:17	RB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-6	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.73	0.46	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	302		mv	1	01/27/19 09:05	RB	ASTM D1498-76M
Solids, Percent	87.3		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	8.00 J		su	1	01/27/19 10:26	RB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-7	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.1	0.44	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	299		mv	1	01/27/19 09:11	RB	ASTM D1498-76M
Solids, Percent	90.3		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	8.08 J		su	1	01/27/19 10:30	RB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 108_M018N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-8	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0	0.46	mg/kg	1	01/28/19 15:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	01/27/19 09:20	RB	ASTM D1498-76M
Solids, Percent	87.6		%	1	01/28/19 08:26	RC	SM2540 G 18TH ED MOD
pH	8.30 J		su	1	01/27/19 10:47	RB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-A18	Date Sampled: 01/25/19
Lab Sample ID: JC81864-2R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.45	mg/kg	1	01/31/19 13:27	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A19	Date Sampled: 01/25/19
Lab Sample ID: JC81864-3R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A17	Date Sampled: 01/25/19
Lab Sample ID: JC81864-4R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64	0.51	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 108_M016_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-5R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.48	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-6R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-7R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.3	0.44	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-8R	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.1	0.46	mg/kg	1	01/31/19 13:32	DC	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190125)		Date Sampled: 01/25/19
Lab Sample ID: JC81864-1A		Date Received: 01/25/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/26/19	01/28/19 PP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/26/19	01/28/19 PP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/26/19	01/28/19 PP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/26/19	01/28/19 PP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/26/19	01/28/19 PP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12282

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190125)		Date Sampled: 01/25/19
Lab Sample ID: JC81864-1A		Date Received: 01/25/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/28/19 10:45	PP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A18		Date Sampled: 01/25/19
Lab Sample ID: JC81864-2A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.5 UJ-	4.5	mg/kg	2	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	33.3	1.1	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	18.1	4.5	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	50.9	5.7	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A18		Date Sampled: 01/25/19
Lab Sample ID: JC81864-2A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.4 32.0	1.6	mg/kg	1	01/28/19 14:58	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A19		Date Sampled: 01/25/19
Lab Sample ID: JC81864-3A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	18.0	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	14.9	4.6	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.4	5.8	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A19		Date Sampled: 01/25/19
Lab Sample ID: JC81864-3A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.4 18.0	1.7	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A17		Date Sampled: 01/25/19
Lab Sample ID: JC81864-4A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	13.8	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	13.1	4.9	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.2	6.1	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A17		Date Sampled: 01/25/19
Lab Sample ID: JC81864-4A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.8 13.2	1.7	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M016_1 Lab Sample ID: JC81864-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/25/19 Date Received: 01/25/19 Percent Solids: 83.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	37.4	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	16.5	4.8	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.7	6.0	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: 108_M016_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-5A	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	35.0 36.1	1.7	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-6A	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	18.8	1.1	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	16.6	4.4	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	5.5	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-6A	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.1 18.8	1.6	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 108_M018N_1 Lab Sample ID: JC81864-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/25/19 Date Received: 01/25/19 Percent Solids: 90.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	64.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	26.0	4.7	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.1	5.8	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/25/19
Lab Sample ID: JC81864-7A	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 90.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	61.1 61.9	1.6	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 108_M018N	Date Sampled: 01/25/19
Lab Sample ID: JC81864-8A	Date Received: 01/25/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	30.6	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.6	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.5	5.8	mg/kg	1	01/25/19	01/28/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46051

(2) Prep QC Batch: MP12281

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018N		Date Sampled: 01/25/19
Lab Sample ID: JC81864-8A		Date Received: 01/25/19
Matrix: SO - Soil		Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.6 24.5	1.7	mg/kg	1	01/28/19 15:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC81918, JC81985, and JC82063

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #32954R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC81918, JC81985, and JC82063 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC81918	FB(20190128)	JC81918-1	Water	1/28/2019		X	X	X
	BS-A4	JC81918-2	Soil	1/28/2019		X	X	X
JC81985	FB(20190129)	JC81985-1	Water	1/29/2019		X	X	X
	SW-A12(0.0-0.5)	JC81985-2	Soil	1/29/2019		X	X	X
	SW-A12(1.0-1.5)	JC81985-3	Soil	1/29/2019		X	X	X
	SW-A13(0.0-0.5)	JC81985-4	Soil	1/29/2019		X	X	X
	SW-A13(2.0-2.5)	JC81985-5	Soil	1/29/2019		X	X	X
	SW-A14(0.0-0.5)	JC81985-6	Soil	1/29/2019		X	X	X
	SW-A14(2.0-2.5)	JC81985-7	Soil	1/29/2019		X	X	X
	SW-A15(0.0-0.5)	JC81985-8	Soil	1/29/2019		X	X	X
	SW-A15(2.0-2.5)	JC81985-9	Soil	1/29/2019		X	X	X
	SW-A16(0.0-0.5)	JC81985-10	Soil	1/29/2019		X	X	X
	SW-A16(2.0-2.5)	JC81985-11	Soil	1/29/2019		X	X	X
	SW-A17(0.0-0.5)	JC81985-12	Soil	1/29/2019		X	X	X
	SW-A17(2.0-2.5)	JC81985-13	Soil	1/29/2019		X	X	X
	BS-A20	JC81985-14	Soil	1/29/2019		X	X	X
JC82063	FB(20190129)-108	JC82063-1	Water	1/29/2019		X	X	X
	BS-A3	JC82063-2	Soil	1/29/2019		X	X	X
	BS-A3TT	JC82063-3	Soil	1/29/2019		X	X	X
	108_M018N	JC82063-4	Soil	1/29/2019		X	X	X
	108_M018N_1	JC82063-5	Soil	1/29/2019		X	X	X
	BS-A4	JC82063-6	Soil	1/29/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).

DATA REVIEW REPORT

2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDG #JC81985: Miscellaneous parameters for sample SW-A16(0.0-0.5) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190129)-108	SW-846 7196A	29.5 hours	< 24 hours from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

DATA REVIEW REPORT

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC81918: The MS analysis performed on sample location BS-A4 in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC81985: The MS analysis performed on sample locations SW-A16(0.0-0.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC82063: The MS analysis performed on sample locations BS-A3 in association with the soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC81985 and JC82063: The MS analysis performed on sample locations SW-A16(0.0-0.5) and BS-A3 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A16(0.0-0.5)	Hexavalent Chromium, Soluble	60.7%	< 50%
BS-A3	Hexavalent Chromium, Insoluble	> 125% but < 150%	AC (99.7%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

SDG #JC82063: The reanalysis of the field sample is usable. No qualification of the sample results was required.

SDG #JC81985: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations BS-A4, SW-A16(0.0-0.5), and BS-A3 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations BS-A4, SW-A16(0.0-0.5), and BS-A3 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-A3 BS-A3TT 108_M018N 108_M018N_1 BS-A4	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
SW-A16(0.0-0.5)	ASTM D3872-86	Analysis: 9 days	< 24 hours from collection
SW-A16(0.0-0.5)	SM4500S2-A	Analysis: 9 days	< 7 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC81918 and JC82063: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC81985: The laboratory duplicate analysis performed on sample locations SW-A12(0.0-0.5) and SW-A16(0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 5, 2019

PEER REVIEW: Dennis Capria

DATE: June 27, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

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www.sgs.com/enhsusa

FED-EX Tracking #
SGS Quote #
Bill of Material Control #
SGS Job #
Ab-12/018-215
JCR1918

Client Reporting Information			Project Information			Requested Analysis (see TEST CODE sheet)										Matrix Codes								
Company Name <i>Accadis</i>			Project Name <i>PP6 Jersey City Site 107</i>			<i>Total Chromium</i> <i>Hexavalent Chromium</i> <i>Trivalent Chromium</i> <i>Antimony</i> <i>Nickel</i> <i>Thallium</i> <i>Vanadium</i>										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank								
Street Address <i>10 Friends Lane Suite 200</i>			Street <i>18 Chapel Avenue</i>																					
City State Zip <i>Newtown PA 18440</i>			City State <i>Jersey City NJ</i>																					
Project Contact <i>Matt Bell</i>			Project # <i>NF000770.0001.00008</i>																					
Phone # <i>646.762.5629</i>			Client Purchase Order #																					
Sampler(s) Name(s) <i>Christon C.elli</i>			Project Manager <i>Jim McLoughlin</i>																					
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY						
								HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	HNO ₂	HNO ₃	HNO ₃	DI Water	MEOH	ENCORE							
<i>1</i>	<i>FB(20190128)</i>		<i>1/28/19</i>	<i>1200</i>	<i>CC</i>	<i>FB</i>	<i>2</i>																	
<i>2</i>	<i>BS-A4</i>		<i>1/28/19</i>	<i>1200</i>	<i>CC</i>	<i>SO</i>	<i>1</i>																	<i>A20</i>
																								<i>C29</i>
																								<i>C60</i>

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Egur</i> <input type="checkbox"/> Other			
Emergency & Rush T/A data available via LabLink				Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				Sample inventory is verified upon receipt in the Laboratory			

Sample Custody must be documented below each time samples change possession, including courier delivery.							
Relinquished by Sampler: <i>1</i>	Date Time: <i>1/28/19 1358</i>	Received By: <i>1 Robert Chambers</i>	Relinquished By: <i>2 Robert Chambers</i>	Date Time: <i>1/28/19 1622</i>	Received By: <i>3</i>	Relinquished by: <i>3</i>	Date Time:
Relinquished by Sampler: <i>4</i>	Date Time:	Received By: <i>4</i>	Relinquished By: <i>4</i>	Date Time:	Received By: <i>4</i>	Relinquished by: <i>5</i>	Date Time:
Custody Seal # <i>14184</i>		Intact <input type="checkbox"/> Not Intact <input type="checkbox"/>		Preserved where applicable <input type="checkbox"/>		On Ice <input checked="" type="checkbox"/> Cooler Temp: <i>3.2 °C</i>	

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.



5.2
5

Report of Analysis

Client Sample ID: FB(20190128)	Date Sampled: 01/28/19
Lab Sample ID: JC81918-1	Date Received: 01/28/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/28/19 19:43	DC	SW846 7196A
Redox Potential Vs H2	345		mv	1	01/29/19 11:19	ST	ASTM D1498-76
pH ^a	5.70		su	1	01/28/19 17:10	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A4	Date Sampled: 01/28/19
Lab Sample ID: JC81918-2	Date Received: 01/28/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9	0.46	mg/kg	1	01/29/19 17:26	NV	SW846 3060A/7196A
Redox Potential Vs H2	311		mv	1	01/29/19	ST	ASTM D1498-76M
Solids, Percent	86.3		%	1	01/29/19 12:39	BG	SM2540 G 18TH ED MOD
pH	7.89		su	1	01/29/19 13:10	ST	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190128) Lab Sample ID: JC81918-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/28/19 Date Received: 01/28/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/29/19	01/29/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/29/19	01/29/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/29/19	01/29/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/29/19	01/29/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/29/19	01/29/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46055

(2) Prep QC Batch: MP12303

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190128)		Date Sampled: 01/28/19
Lab Sample ID: JC81918-1A		Date Received: 01/28/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/29/19 18:18	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A4		Date Sampled: 01/28/19
Lab Sample ID: JC81918-2A		Date Received: 01/28/19
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/28/19	01/29/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	21.7	1.1	mg/kg	1	01/28/19	01/29/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.3	4.5	mg/kg	1	01/28/19	01/29/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/28/19	01/29/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.8	5.6	mg/kg	1	01/28/19	01/29/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46055

(2) Prep QC Batch: MP12302

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A4	Date Sampled: 01/28/19
Lab Sample ID: JC81918-2A	Date Received: 01/28/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.8	1.6	mg/kg	1	01/29/19 17:26	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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www.sgs.com/ehsusa

FED-EX Tracking #		Bottle Order Control #	
SGS Quote #		SGS Job # JC81985	
Requested Analysis (see TEST CODE sheet)			
Matrix Codes			
DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
LAB USE ONLY			

Client / Reporting Information		Project Information			
Company Name Arcadis		Project Name PPG Jersey City Site 107			
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Avenue		Billing Information (if different from Report to)	
City Newton PA 18440		City Jersey City NJ		Company Name	
Project Contact Matt Bell		Project # NP000770.0001.00008		Street Address	
Phone # 646.762.5629		Client Purchase Order #		City	
Sampler(s) Name(s) Christina CiGilli		Project Manager Jim McLaughlin		Attention:	

Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection		Sampled by	Matrix	# of bottles	Number of preserved bottles																	
			Date	Time				HCl	NH4Cl	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE										
1	FB(20190129)		1/29/19	1200	CC	FB	2									X	X	X	X	X	X	X			
2	SW-A12(0.0-0.5)		1/29/19	0900	CC	SO	1									X	X	X	X	X	X	X			
3	SW-A12(1.0-1.5)		1/29/19	0910	CC	SO	1									X	X	X	X	X	X	X			
4	SW-A13(0.0-0.5)		1/29/19	0930	CC	SO	1									X	X	X	X	X	X	X			
5	SW-A13(2.0-2.5)		1/29/19	0940	CC	SO	1									X	X	X	X	X	X	X			
6	SW-A14(0.0-0.5)		1/29/19	0950	CC	SO	1									X	X	X	X	X	X	X			
7	SW-A14(2.0-2.5)		1/29/19	1000	CC	SO	1									X	X	X	X	X	X	X			
8	SW-A15(0.0-0.5)		1/29/19	1010	CC	SO	1									X	X	X	X	X	X	X			
9	SW-A15(2.0-2.5)		1/29/19	1020	CC	SO	1									X	X	X	X	X	X	X			
10	SW-A16(0.0-0.5)		1/29/19	1030	CC	SO	1									X	X	X	X	X	X	X			
11	SW-A16(2.0-2.5)		1/29/19	1040	CC	SO	1									X	X	X	X	X	X	X			

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information		Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Egris</i> <input type="checkbox"/> Other		Commercial "A" - Results Only; Commercial "B" - Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data Sample inventory is verified upon receipt in the Laboratory	

Sample Custody must be documented below each time samples change possession, including courier delivery.							
1	Relinquished by Sampler: <i>[Signature]</i>	Date Time: 1/29/19 1410	Received By: <i>Robert Chambers</i>	Date Time: 1503	Received By: <i>[Signature]</i>	Date Time:	Received By:
3	Relinquished by Sampler:	Date Time:	Received By: 3	Date Time:	Received By:	Date Time:	Received By:
5	Relinquished by:	Date Time:	Received By: 5	Date Time:	Received By:	Date Time:	Received By:
			Custody Seal # 18518	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp. 16.1°C



5.2
5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC81985

Client / Reporting Information
Project Information
Requested Analysis (see TEST CODE sheet)
Matrix Codes
Lab Sample #
Field ID / Point of Collection
MEOH/DI Vial #
Date
Time
Sampled by
Matrix
of bottles
Number of preserved bottles
Total Chromium
Hexavalent Chromium
Trivalent Chromium
Antimony
Thallium
Vanadium
Nickel
LAB USE ONLY
Turnaround Time (Business days)
Data Deliverable Information
Comments / Special Instructions
Approved by (SGS Project Manager)/Date:
Commercial "A" (Level 1)
Commercial "B" (Level 2)
FULLT1 (Level 3+4)
NJ Reduced
Commercial "C"
NYASP Category A
NYASP Category B
State Forms
EDD Format
Other
NJ Data of Known Quality Protocol Reporting
Commercial "A" = Results Only; Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data
Sample inventory is verified upon receipt in the Laboratory
Relinquished by Sampler:
Date Time:
Received By:
Relinquished by Sampler:
Date Time:
Received By:
Relinquished by Sampler:
Date Time:
Received By:
Custody Seal #
Intact
Not Intact
Preserved where applicable
On Ice
Cooler Temp.

5.2
5



Report of Analysis

Client Sample ID: FB(20190129)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-1	Date Received: 01/29/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/29/19 19:57	LS	SW846 7196A
Redox Potential Vs H2	324		mv	1	01/30/19 12:15	RI	ASTM D1498-76
pH ^a	5.63		su	1	01/29/19 16:26	HM	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A12(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-2	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62 J-	0.49	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	302		mv	1	01/30/19 15:12	RI	ASTM D1498-76M
Solids, Percent	81.6		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.66		su	1	01/30/19 14:49	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A12(1.0-1.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-3	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 64.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.62	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	286		mv	1	01/30/19 15:19	RI	ASTM D1498-76M
Solids, Percent	64.7		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.42		su	1	01/30/19 14:53	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A13(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-4	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.50	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	282		mv	1	01/30/19 15:25	RI	ASTM D1498-76M
Solids, Percent	80.4		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.19		su	1	01/30/19 14:56	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A13(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-5	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.47 J-	0.47	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	01/30/19 15:28	RI	ASTM D1498-76M
Solids, Percent	85.7		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	8.51		su	1	01/30/19 15:00	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A14(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-6	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.94 J-	0.50	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	01/30/19 15:30	RI	ASTM D1498-76M
Solids, Percent	79.9		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.33		su	1	01/30/19 15:04	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A14(2.0-2.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-7		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44 UJ-	0.44	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	01/30/19 15:33	RI	ASTM D1498-76M
Solids, Percent	89.9		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	8.69		su	1	01/30/19 15:11	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A15(0.0-0.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-8		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98 J-	0.49	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	01/30/19 15:37	RI	ASTM D1498-76M
Solids, Percent	81.7		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.41		su	1	01/30/19 15:14	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A15(2.0-2.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-9		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.51	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	01/30/19 15:39	RI	ASTM D1498-76M
Solids, Percent	78.2		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.40		su	1	01/30/19 15:17	RI	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A16(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-10	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.90 J-	0.50	mg/kg	1	01/31/19 14:49	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	01/30/19 15:41	RI	ASTM D1498-76M
Solids, Percent	80.7		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	6.86		su	1	01/30/19 15:19	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A16(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-11	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 74.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 J-	0.54	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	299		mv	1	01/30/19 15:48	RI	ASTM D1498-76M
Solids, Percent	74.1		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	8.05		su	1	01/30/19 15:32	RI	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A17(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-12	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.5 J-	0.49	mg/kg	1	01/31/19 14:57	DC	SW846 3060A/7196A
Redox Potential Vs H2	308		mv	1	01/30/19 15:50	RI	ASTM D1498-76M
Solids, Percent	82.3		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	7.54		su	1	01/30/19 15:34	RI	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A17(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-13	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.6 J-	0.50	mg/kg	1	01/31/19 14:59	DC	SW846 3060A/7196A
Redox Potential Vs H2	308		mv	1	01/30/19 15:56	RI	ASTM D1498-76M
Solids, Percent	80.8		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	8.02		su	1	01/30/19 15:37	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A20	Date Sampled: 01/29/19
Lab Sample ID: JC81985-14	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.3 J-	0.46	mg/kg	1	01/31/19 14:59	DC	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	01/30/19 16:02	RI	ASTM D1498-76M
Solids, Percent	87.2		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
pH	8.08		su	1	01/30/19 15:39	RI	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A12(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-2R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A12(1.0-1.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-3R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 64.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.62	0.62	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A13(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-4R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	02/05/19 12:24	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A13(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-5R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55	0.47	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A14(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-6R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8	0.50	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A14(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-7R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A15(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-8R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.1	0.49	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A15(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-9R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59	0.51	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A16(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-10R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	02/05/19 12:17	RI	SW846 3060A/7196A

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A16(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-10RT	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.78 J	0.20	%	1	02/07/19 11:15	ST	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	02/07/19 11:15	ST	SM4500S2- A-11
Total Organic Carbon	52400	120	mg/kg	1	02/07/19 17:46	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A16(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-11R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 74.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.4	0.54	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-12R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.8	0.49	mg/kg	1	02/05/19 12:24	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-13R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.0	0.50	mg/kg	1	02/05/19 12:26	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A20	Date Sampled: 01/29/19
Lab Sample ID: JC81985-14R	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.48	0.46	mg/kg	1	02/05/19 12:26	RI	SW846-3060A/7196A

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: FB(20190129) Lab Sample ID: JC81985-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12316

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190129) Lab Sample ID: JC81985-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/30/19 17:46	PP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A12(0.0-0.5) Lab Sample ID: JC81985-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 81.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	364	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	58.8	5.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.6	2.6	mg/kg	2	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	65.2	6.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A12(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-2A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	363	1.8	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A12(1.0-1.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-3A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 64.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	35.7	1.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	22.0	6.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	43.9	7.8	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A12(1.0-1.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-3A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 64.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.1	2.2	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A13(0.0-0.5) Lab Sample ID: JC81985-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 80.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	24.0	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	16.5	5.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.0	6.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A13(0.0-0.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-4A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.9	1.8	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A13(2.0-2.5) Lab Sample ID: JC81985-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 85.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	27.1	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	18.8	4.7	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.9	5.8	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A13(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-5A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.6	1.7	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A14(0.0-0.5) Lab Sample ID: JC81985-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 79.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	60.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	25.4	5.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.0	6.5	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A14(0.0-0.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-6A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	59.4	1.8	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A14(2.0-2.5) Lab Sample ID: JC81985-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 89.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	14.9	4.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	5.5	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A14(2.0-2.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-7A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 89.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.3	1.5	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A15(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-8A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	58.5	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	29.7	4.8	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.2	5.9	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A15(0.0-0.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-8A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	57.5	1.7	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A15(2.0-2.5) Lab Sample ID: JC81985-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 78.2
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	36.1	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	15.6	5.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	41.0	6.5	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A15(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-9A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.8	1.8	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A16(0.0-0.5) Lab Sample ID: JC81985-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 80.7
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	43.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	37.7	5.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.2	6.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A16(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-10A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	42.4	1.8	mg/kg	1	01/31/19 14:49	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A16(2.0-2.5) Lab Sample ID: JC81985-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/29/19 Percent Solids: 74.1
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	125	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	21.2	5.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	46.7	6.6	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A16(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-11A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 74.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	123	1.8	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(0.0-0.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-12A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	180	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	15.7	4.9	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.6	6.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(0.0-0.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-12A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	175	1.7	mg/kg	1	01/31/19 14:57	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(2.0-2.5)	Date Sampled: 01/29/19
Lab Sample ID: JC81985-13A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	143	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	17.4	4.9	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.9	6.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A17(2.0-2.5)		Date Sampled: 01/29/19
Lab Sample ID: JC81985-13A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	136	1.7	mg/kg	1	01/31/19 14:59	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A20	Date Sampled: 01/29/19
Lab Sample ID: JC81985-14A	Date Received: 01/29/19
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	29.2	1.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	15.6	4.4	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.1	5.5	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A20		Date Sampled: 01/29/19
Lab Sample ID: JC81985-14A		Date Received: 01/29/19
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.9	1.6	mg/kg	1	01/31/19 14:59	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

50
FB

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsususa

Client / Reporting Information		Project Information						Requested Analysis (see TEST CODE sheet)											Matrix Codes									
Company Name Arcadis		Project Name PPG Jersey City Site 107						<table border="0" style="width:100%; text-align: center;"> <tr><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Chromium</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Hexavalent Chromium</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Trivalent Chromium</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Antimony</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Nickel</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Thallium</td><td style="writing-mode: vertical-rl; transform: rotate(180deg);">Vanadium</td></tr> </table>											Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium																						
Street Address 10 Friends Lane Suite 200		Street 18 Chapel Ave		Billing Information (If different from Report to)		Company Name																						
City Newton NJ		City Jersey City NJ		Project #		Street Address																						
State NJ		State NJ		Client Purchase Order #		City																						
Zip 18440		Zip 07310		Project #		State																						
E-mail M.H. Bell		E-mail Simon McLaughlin		Client Purchase Order #		Zip																						
Phone # 646.767.5629		Phone #		Project Manager		Attention:																						
Sampler(s) Name(s) Christin Cifelli		Project Manager Simon McLaughlin		Attention:																								
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles											LAB USE ONLY	
																HCl HNO3 H2SO4 HNO3 H2SO4 NONE DI Water MCON ENCORE												
1		FB(20190129)-108				11/29/19		1630		CB FB		2				X X											A24	
2		BS-A3S BS-A3				11/29/19		1410		CB SO		1				X X											G26	
3		BS - A3TT				11/29/19		1415		CB SO		1				X X											M26	
4		108-M018N				11/29/19		1420		CB SO		1				X X												
5		108-M018N-1				11/29/19		1430		CB SO		1				X X												
6		BS - A4				11/29/19		1435		CB SO		1				X X												
Turnaround Time (Business days)		Data Deliverable Information						Comments / Special Instructions																				
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____ _____ _____ _____						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>						<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Eqv</i> <input type="checkbox"/> Other						INITIAL ASSESSMENT <i>2A/JP</i> LABEL VERIFICATION <i>JK</i>								
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.						Sample inventory is verified upon receipt in the Laboratory																				
1		Relinquished By: <i>[Signature]</i>		Date Time: 11/30/19 12:10		Received By: <i>Robert Chambers</i>		Date Time: 11/30		Relinquished By: <i>Robert Chambers</i>		Date Time: 11/30/19		Received By: <i>[Signature]</i>														
3		Relinquished by Sampler:		Date Time:		Received By: 3		Date Time:		Relinquished By: 4		Date Time:		Received By: 4														
5		Relinquished by:		Date Time:		Received By: 5		Date Time:		Custody Seal # <i>130910</i>		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		Preserved where applicable <input type="checkbox"/>								On Ice <input checked="" type="checkbox"/> Cooler Temp <i>31°C</i>						

5.2
5

Report of Analysis

Client Sample ID: FB (20190129)-108	Date Sampled: 01/29/19
Lab Sample ID: JC82063-1	Date Received: 01/30/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010 UJ	0.010	mg/l	1	01/30/19 22:00	LS	SW846 7196A
Redox Potential Vs H2	348		mv	1	01/31/19 19:50	EB	ASTM D1498-76
pH ^b	5.84		su	1	01/30/19 17:44	HM	SM4500H+ B-11

(a) Analysis done out of holding time.

(b) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A3	Date Sampled: 01/29/19
Lab Sample ID: JC82063-2	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.44	mg/kg	1	02/01/19 10:15	RI	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	01/31/19 15:16	RI	ASTM D1498-76M
Solids, Percent	90.1		%	1	01/31/19 15:00	RC	SM2540 G 18TH ED MOD
pH	8.58 J		su	1	01/31/19 15:02	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A3TT	Date Sampled: 01/29/19
Lab Sample ID: JC82063-3	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0	0.45	mg/kg	1	02/01/19 10:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	271		mv	1	01/31/19 15:18	RI	ASTM D1498-76M
Solids, Percent	89.8		%	1	01/31/19 15:00	RC	SM2540 G 18TH ED MOD
pH	8.82 J		su	1	01/31/19 15:04	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 108_M018N	Date Sampled: 01/29/19
Lab Sample ID: JC82063-4	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2	0.45	mg/kg	1	02/01/19 10:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	01/31/19 15:19	RI	ASTM D1498-76M
Solids, Percent	88.8		%	1	01/31/19 15:00	RC	SM2540 G 18TH ED MOD
pH	8.50 J		su	1	01/31/19 15:06	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/29/19
Lab Sample ID: JC82063-5	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.5	0.45	mg/kg	1	02/01/19 10:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	281		mv	1	01/31/19 15:27	RI	ASTM D1498-76M
Solids, Percent	88.5		%	1	01/31/19 15:00	RC	SM2540 G 18TH ED MOD
pH	8.06 J		su	1	01/31/19 15:16	RI	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-A4	Date Sampled: 01/29/19
Lab Sample ID: JC82063-6	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61	0.44	mg/kg	1	02/01/19 10:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	01/31/19 15:29	RI	ASTM D1498-76M
Solids, Percent	90.4		%	1	01/31/19 15:00	RC	SM2540 G 18TH ED MOD
pH	8.44 J		su	1	01/31/19 15:18	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A3	Date Sampled: 01/29/19
Lab Sample ID: JC82063-2R	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8	0.44	mg/kg	1	02/04/19 15:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A3TT	Date Sampled: 01/29/19
Lab Sample ID: JC82063-3R	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.9	0.45	mg/kg	1	02/04/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 108_M018N		Date Sampled: 01/29/19
Lab Sample ID: JC82063-4R		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2	0.45	mg/kg	1	02/04/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/29/19
Lab Sample ID: JC82063-5R	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.45	mg/kg	1	02/04/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-A4	Date Sampled: 01/29/19
Lab Sample ID: JC82063-6R	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	02/04/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB (20190129)-108 Lab Sample ID: JC82063-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/30/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12330

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20190129)-108	Date Sampled: 01/29/19
Lab Sample ID: JC82063-1A	Date Received: 01/30/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	01/31/19 19:10	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A3		Date Sampled: 01/29/19
Lab Sample ID: JC82063-2A		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	28.3	1.1	mg/kg	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.7	4.4	mg/kg	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.2	5.5	mg/kg	1	01/31/19	01/31/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12331

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A3		Date Sampled: 01/29/19
Lab Sample ID: JC82063-2A		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.7 26.5	1.5	mg/kg	1	02/01/19 10:15	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A3TT	Date Sampled: 01/29/19
Lab Sample ID: JC82063-3A	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	75.8	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	15.0	4.6	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	5.7	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12331

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-A3TT		Date Sampled: 01/29/19
Lab Sample ID: JC82063-3A		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	69.8 65.9	1.6	mg/kg	1	02/01/19 10:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 108_M018N	Date Sampled: 01/29/19
Lab Sample ID: JC82063-4A	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	49.0	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.5	4.5	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	5.6	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12331

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M018N		Date Sampled: 01/29/19
Lab Sample ID: JC82063-4A		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 88.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	44.8 45.8	1.6	mg/kg	1	02/01/19 10:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M018N_1 Lab Sample ID: JC82063-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/29/19 Date Received: 01/30/19 Percent Solids: 88.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	60.7	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	15.1	4.5	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	5.6	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12331

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: 108_M018N_1	Date Sampled: 01/29/19
Lab Sample ID: JC82063-5A	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	57.2 58.5	1.6	mg/kg	1	02/01/19 10:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A4		Date Sampled: 01/29/19
Lab Sample ID: JC82063-6A		Date Received: 01/30/19
Matrix: SO - Soil		Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	16.6	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.9	4.5	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	5.6	mg/kg	1	01/31/19	01/31/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46067

(2) Prep QC Batch: MP12331

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A4	Date Sampled: 01/29/19
Lab Sample ID: JC82063-6A	Date Received: 01/30/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.0 16.6	1.5	mg/kg	1	02/01/19 10:18	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC82122, JC82164, JC82413, and JC83087

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33162R

Review Level: Tier III

Project: NP000770.0001.00020 (3001755)

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC82122, JC82164, JC82413, and JC83087 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC82122	FB(20190130)	JC82122-1	Water	1/30/2019		X	X	X
	BS-B16T	JC82122-2	Soil	1/30/2019		X	X	X
	BS-C17T	JC82122-3	Soil	1/30/2019		X	X	X
JC82164	FB(20190131)	JC82164-1	Water	1/31/2019		X	X	X
	FB(20190201)	JC82164-2	Water	2/1/2019		X	X	X
	BS-C20	JC82164-3	Soil	1/31/2019		X	X	X
	BS-B20	JC82164-4	Soil	1/31/2019		X	X	X
	BS-C19	JC82164-5	Soil	2/1/2019		X	X	X
	BS-B19	JC82164-6	Soil	2/1/2019		X	X	X
JC82413	FB(20190206)	JC82413-1	Water	2/6/2019		X	X	X
	BS-C16	JC82413-2	Soil	2/6/2019		X	X	X
	BS-E17D	JC82413-3	Soil	2/6/2019		X	X	X
	BS-D17D	JC82413-4	Soil	2/6/2019		X	X	X
JC83087	FB(20190219)	JC83087-1	Water	2/19/2019		X	X	X
	BS-B18	JC83087-2	Soil	2/19/2019		X	X	X
	DUP-22(20190219)	JC83087-3	Soil	2/19/2019	BS-C18T	X	X	X
	BS-D19	JC83087-4	Soil	2/19/2019		X	X	X
	BS-D18	JC83087-5	Soil	2/19/2019		X	X	X
	BS-C18T	JC83087-6	Soil	2/19/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

4. SDGs #JC82122, JC82164, JC82413, and JC83087: Miscellaneous parameters for sample BS-C17T, BS-B19, BS-E17D, and BS-B18 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC82122, JC82164, and JC82413: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC83087: The MS/MSD analysis performed on sample location BS-B18 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-B18	Antimony	71.8%	71.4%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC82122, JC82164, and JC82413: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC83087: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-A9. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-C18T / DUP-22(20190219)	Chromium	14.1	14.8	4.8%
	Trivalent Chromium	13.2	12.6	4.7%
	Nickel	48.6	28.0	NC
	Vanadium	16.1	17.0	AC

Notes:

AC = Acceptable

NC = Not compliant

The difference in the nickel results between the parent sample BS-C18T and field duplicate sample DUP-22(20190219) was not in agreement. The associated results were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC82122, JC82164, and JC82413: The serial dilution analysis was not performed using a sample from these SDGs.

DATA REVIEW REPORT

SDG #JC83087: The serial dilution analysis performed using sample BS-B18 exhibited %D within the control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC82122, JC82164, JC82413, and JC83087: The MS analysis performed on sample locations BS-B16T, BS-B19, BS-E17D, and BS-B18 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-B16T	Hexavalent Chromium, Soluble	< 50%	53.3%
	Hexavalent Chromium, Insoluble	AC (81.8%)	69.8%
BS-B19	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	52.9%	AC (75.4%)
BS-E17D	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	< 50%	72.2%
BS-B18	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	< 50%	< 50%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC82122 and JC82164: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC82413: The reanalyses of the field samples are usable with appropriate qualification. No sample results were rejected.

DATA REVIEW REPORT

SDG #JC83087: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use ("RA" qualifier).

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC82122: The PDS analysis performed on sample location BS-B16T exhibited recoveries within the control limits.

SDGs #JC82164, JC82413, and JC83087: The PDS analysis performed on sample locations BS-B19, BS-E17D, and BS-B18 exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-B19	Hexavalent Chromium	< 85%	< 85%
BS-E17D	Hexavalent Chromium	< 85%	< 85%
BS-B18	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC82122: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

DATA REVIEW REPORT

Sample Location	Analytes
BS-B16T	Hexavalent Chromium

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

SDGs #JC82164, JC82413, and JC83087: The laboratory duplicate analysis performed on sample locations BS-B19, BS-E17D, and BS-B18 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

SDG #JC83087: The field duplicate analysis was not evaluated since the hexavalent chromium results in the parent sample BS-C18T and field duplicate sample DUP-22(20190219) were rejected due to MS/MSD recoveries outside of the control limits (see Section 4.1).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190206)	SM4500H+B	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-B16T BS-C17T	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-C19 BS-B19		Analysis: 3 days	
BS-C20 BS-B20		Analysis: 4 days	
BS-C17T BS-B19 BS-E17D BS-B18	ASTM D3872-86	Analysis: 8 days Analysis: 11 days Analysis: 12 days Analysis: 13 days	< 24 hours from collection
BS-C17T BS-B19 BS-E17D BS-B18	SM4500S2-A	Analysis: 8 days Analysis: 11 days Analysis: 12 days Analysis: 13 days	< 7 days from collection

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
BS-B19	Lloyd Kahn	Analysis: 15 days	< 14 days from collection
BS-B18		Analysis: 27 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

SDGs #JC82122 and JC82413: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC82164 and JC83087: The laboratory duplicate analysis performed on sample locations BS-B19 and BS-B18 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-C18T / DUP-22(20190219)	Redox	230	255	10.3%
	pH	7.03	6.90	1.9%

The differences in the results between the parent sample BS-C18T and field duplicate sample DUP-22(20190219) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 18, 2019

PEER REVIEW: Dennis Capria

DATE: July 12, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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FB

CHAIN OF CUSTODY

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FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # <u>JC82122</u>

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes
Company Name <u>ArCADIS</u>		Project Name: <u>PP6 Jersey City Site 107</u>										<u>Total Chromium</u> <u>Hexavalent Chromium</u> <u>Trivalent Chromium</u> <u>Antimony</u> <u>Nickel</u> <u>Thallium</u> <u>Vanadium</u>							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address <u>10 Friends Lane; Suite 200</u>		Street <u>18 Chapel Ave</u>																	
City State Zip <u>Newtown PA 18440</u>		City State <u>Jersey City NJ</u>																	
Project Contact <u>Matt Bell</u>		Project # <u>N8000770.0001.00008</u>																	
Phone # <u>610.762.5629</u>		Client Purchase Order #																	
Sampler(s) Name(s) <u>Christina Cifelli</u>		Project Manager <u>Jim McLaughlin</u>																	
Lab Sample #		Collection																	LAB USE ONLY
Field ID / Point of Collection		MEOH/DI Vial #																	
		Date																	
		Time																	
		Sampled by																	
		Matrix																	
		# of bottles																	
		ICI																	
		NIrOH																	
		HN03																	
		H2SO4																	
		NONE																	
		DI Water																	
		MEDIH																	
		ENDDIPE																	
1 <u>FB(20190130)</u>												X X X X X X X							AZ4
2 <u>BS - B16 T</u>												X X X X X X X							G3
3 <u>BS - C16 T</u>												X X X X X X X							D55

INITIAL ASSESSMENT JA
LABEL VERIFICATION _____

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions						
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date: _____ _____ _____ _____										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format <u>Egvis</u> <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other _____ NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data						

Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory is verified upon receipt in the Laboratory						
Relinquished by Sampler: <u>1</u>		Date Time: <u>01/31/19 12:18</u>										Received By: <u>[Signature]</u>						
Relinquished by Sampler: <u>3</u>		Date Time:										Received By: <u>[Signature]</u>						
Relinquished by: <u>5</u>		Date Time:										Received By: <u>[Signature]</u>						
		Custody Seal # <u>14212</u>										<input type="checkbox"/> Intact <input type="checkbox"/> Not intact Preserved where applicable <input type="checkbox"/> On Ice <input checked="" type="checkbox"/> Soak Temp. <u>19°C I</u>						



5.2
5

Report of Analysis

Client Sample ID: FB (20190130)	Date Sampled: 01/30/19
Lab Sample ID: JC82122-1	Date Received: 01/31/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	01/31/19 14:29	DC	SW846 7196A
Redox Potential Vs H2	382		mv	1	01/31/19 20:12	EB	ASTM D1498-76
pH ^a	5.58		su	1	01/31/19 13:39	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B16T	Date Sampled: 01/30/19
Lab Sample ID: JC82122-2	Date Received: 01/31/19
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.51	mg/kg	1	02/04/19 10:19	RI	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	02/01/19 19:33	EB	ASTM D1498-76M
Solids, Percent	78.4		%	1	02/01/19 09:09	RC	SM2540 G 18TH ED MOD
pH	7.68 J		su	1	02/01/19 19:29	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17T	Date Sampled: 01/30/19
Lab Sample ID: JC82122-3	Date Received: 01/31/19
Matrix: SO - Soil	Percent Solids: 66.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.60 UJ	0.60	mg/kg	1	02/04/19 10:20	RI	SW846 3060A/7196A
Redox Potential Vs H2	261		mv	1	02/01/19 19:41	EB	ASTM D1498-76M
Solids, Percent	66.8		%	1	02/01/19 09:09	RC	SM2540 G 18TH ED MOD
pH	7.15 J		su	1	02/01/19 19:40	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B16T	Date Sampled: 01/30/19
Lab Sample ID: JC82122-2R	Date Received: 01/31/19
Matrix: SO - Soil	Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4	0.51	mg/kg	1	02/06/19 10:39	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C17T	Date Sampled: 01/30/19
Lab Sample ID: JC82122-3R	Date Received: 01/31/19
Matrix: SO - Soil	Percent Solids: 66.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.60	mg/kg	1	02/06/19 10:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17T		Date Sampled: 01/30/19
Lab Sample ID: JC82122-3RT		Date Received: 01/31/19
Matrix: SO - Soil		Percent Solids: 66.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.86 J	0.20	%	1	02/07/19 11:15	ST	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	02/07/19 11:15	ST	SM4500S2- A-11
Total Organic Carbon	106000	150	mg/kg	1	02/07/19 19:23	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB (20190130) Lab Sample ID: JC82122-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/30/19 Date Received: 01/31/19 Percent Solids: n/a
---	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46075

(2) Prep QC Batch: MP12348

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB (20190130)	Date Sampled: 01/30/19
Lab Sample ID: JC82122-1A	Date Received: 01/31/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/01/19 18:18	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B16T Lab Sample ID: JC82122-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/30/19 Date Received: 01/31/19 Percent Solids: 78.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	175	1.2	mg/kg	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	18.9	4.9	mg/kg	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	6.1	mg/kg	1	02/01/19	02/01/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46079

(2) Prep QC Batch: MP12345

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B16T		Date Sampled: 01/30/19
Lab Sample ID: JC82122-2A		Date Received: 01/31/19
Matrix: SO - Soil		Percent Solids: 78.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	174	1.7	mg/kg	1	02/04/19 10:19	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17T Lab Sample ID: JC82122-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/30/19 Date Received: 01/31/19 Percent Solids: 66.8
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	02/01/19	02/01/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	40.1	1.4	mg/kg	1	02/01/19	02/01/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	19.3	5.8	mg/kg	1	02/01/19	02/01/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	02/01/19	02/01/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	18.8	7.2	mg/kg	1	02/01/19	02/01/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46079

(2) Prep QC Batch: MP12345

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C17T		Date Sampled: 01/30/19
Lab Sample ID: JC82122-3A		Date Received: 01/31/19
Matrix: SO - Soil		Percent Solids: 66.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	40.1	2.0	mg/kg	1	02/04/19 10:20	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



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F08

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08818
TEL: 732-329-0200 FAX: 732-329-3499/3480
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E

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC82164

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes														
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)										<table border="1"> <tr> <td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td> </tr> <tr> <td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium																														
X	X	X	X	X	X	X																														
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																																		
City, State, Zip: Newtown, PA 19440		City, State: Jersey City NJ																																		
Project Contact: Matthew Bell		Billing Information (if different from Report to): Company Name:																																		
Phone #: 610.755.7080		Project #: NP000770.0001																																		
Sampler(s) Name(s): C Buchanan / C Cifelli		Client Purchase Order #:																																		
Project Manager: Jim McLaughlin, Jr.		Attention:																																		
SGS Sample #	Field ID / Point of Collection	MEOH/DI Vol #	Date	Time	Sampled by	Grid (G) Comp (C)	Matrix	# of bottles	HC	MECH	PHOS	H-SOL	NONE	DI / W/ET	MECH	ENCODE	Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY												
1	FB(20190131)		1/31/19	1500	CC	G	FB	2									X	X	X	X	X	X	X													
2	FB(20190201)		2/1/19	1000	CB	G	FB	2									X	X	X	X	X	X	X													
3	BS-C20		1/31/19	1300	CC	G	SO	1									X	X	X	X	X	X	X													
4	BS-B20		1/31/19	1245	CB	G	SO	1									X	X	X	X	X	X	X													
5	BS-C19		2/1/19	0915	CC	G	SO	1									X	X	X	X	X	X	X													
6	BS-B19		2/1/19	0900	CC	G	SO	1									X	X	X	X	X	X	X													

5.2
5

INITIAL ASSESSMENT 3/1/19
LABEL VERIFICATION

Turn Around Time (Business Days)		Deliverable										Comments / Special instructions									
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other _____ <small>All data available via Lablink</small>		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> DOD-QSMS <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> MA MCP Criteria _____ <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> CT RCP Criteria _____ <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input checked="" type="checkbox"/> EDD Format_Equid_										Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions									

Sample Custody must be documented below each time samples change possession, including courier delivery.

Requested By: <i>[Signature]</i>	Date / Time: 2/1/19 1050	Received By: <i>Robert Chambers</i>	Date / Time: 2-1-19 11:35
Requested By: <i>[Signature]</i>	Date / Time: 3	Received By: <i>[Signature]</i>	Date / Time: 4
Requested By: <i>[Signature]</i>	Date / Time: 5	Received By: <i>[Signature]</i>	Date / Time: 6

Relinquished to: SGS Post Ex Sample COCs Term # 23098109

Custody Seal # 14294 Intact Not Intact

Preserved when Applicable: Absent Present

On Ice: No Yes Cooler Temp: 32°C



Report of Analysis

Client Sample ID: FB(20190131)	Date Sampled: 01/31/19
Lab Sample ID: JC82164-1	Date Received: 02/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/01/19 13:43	RI	SW846 7196A
Redox Potential Vs H2	280		mv	1	02/01/19 20:29	EB	ASTM D1498-76
pH ^a	5.58		su	1	02/01/19 12:24	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190201)		Date Sampled: 02/01/19
Lab Sample ID: JC82164-2		Date Received: 02/01/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/01/19 13:43	RI	SW846 7196A
Redox Potential Vs H2	288		mv	1	02/01/19 20:35	EB	ASTM D1498-76
pH ^a	4.61		su	1	02/01/19 12:29	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-3	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 52.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.76 UJ-	0.76	mg/kg	1	02/04/19 17:22	DC	SW846 3060A/7196A
Redox Potential Vs H2	277		mv	1	02/04/19 18:00	EPS	ASTM D1498-76M
Solids, Percent	52.7		%	1	02/04/19 08:45	RC	SM2540 G 18TH ED MOD
pH	6.97 J		su	1	02/04/19 16:37	EPS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-4	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 70.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.57	mg/kg	1	02/04/19 17:22	DC	SW846 3060A/7196A
Redox Potential Vs H2	267		mv	1	02/04/19 18:05	EPS	ASTM D1498-76M
Solids, Percent	70.1		%	1	02/04/19 08:45	RC	SM2540 G 18TH ED MOD
pH	6.61 J		su	1	02/04/19 17:11	EPS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-5	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 53.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.75 UJ-	0.75	mg/kg	1	02/04/19 17:22	DC	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	02/04/19 18:07	EPS	ASTM D1498-76M
Solids, Percent	53.4		%	1	02/04/19 08:45	RC	SM2540 G 18TH ED MOD
pH	6.98 J		su	1	02/04/19 17:29	EPS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-6	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	02/04/19 17:15	DC	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	02/04/19 17:48	EPS	ASTM D1498-76M
Solids, Percent	85.6		%	1	02/04/19 08:45	RC	SM2540 G 18TH ED MOD
pH	6.58 J		su	1	02/04/19 16:35	EPS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-3R	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 52.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.76	mg/kg	1	02/08/19 12:51	DC	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-4R	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 70.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.57	0.57	mg/kg	1	02/08/19 12:51	DC	SW846-3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-5R	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 53.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.75	0.75	mg/kg	1	02/08/19 12:51	DC	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-6R	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56	0.47	mg/kg	1	02/08/19 12:45	DC	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B19		Date Sampled: 02/01/19
Lab Sample ID: JC82164-6RT		Date Received: 02/01/19
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	02/12/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	02/12/19 12:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	15500 J	120	mg/kg	1	02/16/19 15:25	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190131) Lab Sample ID: JC82164-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 01/31/19 Date Received: 02/01/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46083

(2) Prep QC Batch: MP12359

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190131)	Date Sampled: 01/31/19
Lab Sample ID: JC82164-1A	Date Received: 02/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/04/19 13:31	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190201)	Date Sampled: 02/01/19
Lab Sample ID: JC82164-2A	Date Received: 02/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46083

(2) Prep QC Batch: MP12359

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190201)	Date Sampled: 02/01/19
Lab Sample ID: JC82164-2A	Date Received: 02/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/04/19 13:37	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-3A	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 52.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.7	3.7	mg/kg	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	54.9	1.8	mg/kg	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	18.0	7.4	mg/kg	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.8	1.8	mg/kg	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.7	9.2	mg/kg	1	02/01/19	02/04/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46081

(2) Prep QC Batch: MP12349

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-3A	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 52.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.9	2.6	mg/kg	1	02/04/19 17:22	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B20		Date Sampled: 01/31/19
Lab Sample ID: JC82164-4A		Date Received: 02/01/19
Matrix: SO - Soil		Percent Solids: 70.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	13.8	1.5	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	10.2	5.9	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	7.4	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46081

(2) Prep QC Batch: MP12349

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B20	Date Sampled: 01/31/19
Lab Sample ID: JC82164-4A	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 70.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.3	2.1	mg/kg	1	02/04/19 17:22	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-5A	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 53.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.7	3.7	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	91.9	1.9	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	19.8	7.4	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.9	1.9	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	33.4	9.3	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46081

(2) Prep QC Batch: MP12349

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C19		Date Sampled: 02/01/19
Lab Sample ID: JC82164-5A		Date Received: 02/01/19
Matrix: SO - Soil		Percent Solids: 53.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	91.3	2.7	mg/kg	1	02/04/19 17:22	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B19		Date Sampled: 02/01/19
Lab Sample ID: JC82164-6A		Date Received: 02/01/19
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	14.3	1.2	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	10.1	4.9	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.0	6.1	mg/kg	1	02/01/19	02/04/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46081

(2) Prep QC Batch: MP12349

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-B19	Date Sampled: 02/01/19
Lab Sample ID: JC82164-6A	Date Received: 02/01/19
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.3	1.7	mg/kg	1	02/04/19 17:15	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
PB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehusa

E

Client / Reporting Information			Project Information										Requested Analysis										Matrix Codes											
Company Name: Arcadis			Project Name: PPG Site 107 (Jersey City)										Requested Analysis:										Matrix Codes:											
Street Address: 10 Friends Lane, Suite 200			Street: 18 Chapel Avenue										Billing Information (if different from Report to):										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank SB - Store Blank TB - Trip Blank											
City: Newtown, PA State: 18440 Zip: 18440			City: Jersey City State: NJ Company Name:										Total Chromium																					
Project Contact: Matthew Bat			Project #: NP000770.0003										Hexavalent Chromium																					
Phone #: 610.755.7080			Client Purchase Order #:										Trivalent Chromium																					
Sampler(s) Name(s): C Buchanan			Project Manager: Jim McLaughlin, Jr.										Antimony																					
Field ID / Point of Collection:			Collection:										Nickel																					
MECH/CI Val:			Date: Time: Sampled by: Lab ID: Matrix: # of bottles:										Thallium																					
1 FB(20190206)			2/6/19 1400 CB G FB 2										Vanadium																					
2 BS-C16			2/6/19 1245 CB G SO 1																															
3 BS-E17D			2/6/19 1215 CB G SO 1																															
4 BS-D17D			2/6/19 1230 CB G SO 1																															
Turn Around Time (Business Days)															Deliverable										Comments / Special Instructions									
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other <small>All data available via LADink</small>															Approved By (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DRGP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equils_					<input type="checkbox"/> DOD-QSMS Commercial "A" = Results only Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/terms-and-conditions				
Sample Custody must be documented below each time samples change possession, including courier delivery.																																		
Date / Time:			Received By:					Requested By:					Date / Time:					Received By:																
3			2/6/19/1405 Robert Buchanan					Robert Buchanan					2/6/19 1548					[Signature]																
5			[Signature]					Custody Seal # 14240					<input type="checkbox"/> Intact <input type="checkbox"/> Not intact					Preserved where applicable <input type="checkbox"/> Assent Therm. ID:																

A3
G43
D63

5.2
5

Initial Assessment AB PDS
Label Verification _____



SGS Post Ex Sample COCs Template 20190109

Report of Analysis

Client Sample ID: FB(20190206)	Date Sampled: 02/06/19
Lab Sample ID: JC82413-1	Date Received: 02/06/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/06/19 22:47	LS	SW846 7196A
Redox Potential Vs H2	319		mv	1	02/07/19 14:43	EB	ASTM D1498-76
pH ^a	5.76 J		su	1	02/08/19 11:01	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C16	Date Sampled: 02/06/19
Lab Sample ID: JC82413-2	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.51	mg/kg	1	02/08/19 11:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	281		mv	1	02/07/19 17:25	EB	ASTM D1498-76M
Solids, Percent	78.8		%	1	02/07/19 09:09	RI	SM2540 G 18TH ED MOD
pH	7.03		su	1	02/07/19 17:22	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17D	Date Sampled: 02/06/19
Lab Sample ID: JC82413-3	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81	0.60	mg/kg	1	02/08/19 11:02	DC	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	02/07/19 17:28	EB	ASTM D1498-76M
Solids, Percent	66.9		%	1	02/07/19 09:09	RI	SM2540 G 18TH ED MOD
pH	6.82		su	1	02/07/19 17:25	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D17D	Date Sampled: 02/06/19
Lab Sample ID: JC82413-4	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89	0.52	mg/kg	1	02/08/19 11:05	DC	SW846 3060A/7196A
Redox Potential Vs H2	276		mv	1	02/07/19 17:34	EB	ASTM D1498-76M
Solids, Percent	76.2		%	1	02/07/19 09:09	RI	SM2540 G 18TH ED MOD
pH	6.83		su	1	02/07/19 17:31	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C16	Date Sampled: 02/06/19
Lab Sample ID: JC82413-2R	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82 J-	0.51	mg/kg	1	02/12/19 12:08	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E17D	Date Sampled: 02/06/19
Lab Sample ID: JC82413-3R	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62 J-	0.60	mg/kg	1	02/12/19 11:59	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17D		Date Sampled: 02/06/19
Lab Sample ID: JC82413-3RT		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.86 J	0.20	%	1	02/18/19 09:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	02/18/19 11:45	MB	SM4500S2- A-11
Total Organic Carbon	64200	150	mg/kg	1	02/16/19 16:35	JO	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D17D	Date Sampled: 02/06/19
Lab Sample ID: JC82413-4R	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68 J-	0.52	mg/kg	1	02/12/19 12:08	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190206)		Date Sampled: 02/06/19
Lab Sample ID: JC82413-1A		Date Received: 02/06/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46105

(2) Prep QC Batch: MP12442

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190206)	Date Sampled: 02/06/19
Lab Sample ID: JC82413-1A	Date Received: 02/06/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/07/19 12:21	PP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C16		Date Sampled: 02/06/19
Lab Sample ID: JC82413-2A		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	17.0	1.3	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	13.7	5.0	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	6.3	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46105

(2) Prep QC Batch: MP12284

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C16		Date Sampled: 02/06/19
Lab Sample ID: JC82413-2A		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.9 16.2	1.8	mg/kg	1	02/08/19 11:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17D		Date Sampled: 02/06/19
Lab Sample ID: JC82413-3A		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	16.1	1.4	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	13.0	5.7	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	7.1	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46105

(2) Prep QC Batch: MP12284

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E17D	Date Sampled: 02/06/19
Lab Sample ID: JC82413-3A	Date Received: 02/06/19
Matrix: SO - Soil	Percent Solids: 66.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.3 15.5	2.0	mg/kg	1	02/08/19 11:02	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D17D		Date Sampled: 02/06/19
Lab Sample ID: JC82413-4A		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Chromium	14.2	1.3	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Nickel	10.3	5.1	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.0	6.4	mg/kg	1	02/06/19	02/07/19 PP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46105

(2) Prep QC Batch: MP12284

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D17D		Date Sampled: 02/06/19
Lab Sample ID: JC82413-4A		Date Received: 02/06/19
Matrix: SO - Soil		Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.3 13.5	1.8	mg/kg	1	02/08/19 11:05	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 136, Dayton, NJ 08819
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/eusa

Job Control #
JC83087

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Collection table with columns for Date, Time, Sampled by, and various analytes. Includes Turn Around Time and Deliverables sections.

INITIAL ASSESSMENT
LABEL VERIFICATION

5.2
5



Report of Analysis

Client Sample ID: FB(20190219)	Date Sampled: 02/19/19
Lab Sample ID: JC83087-1	Date Received: 02/19/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/20/19 09:52	DC	SW846 7196A
Redox Potential Vs H2	501		mv	1	02/20/19 12:43	RI	ASTM D1498-76
pH ^a	5.94		su	1	02/19/19 17:10	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B18	Date Sampled: 02/19/19
Lab Sample ID: JC83087-2	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93 RA	0.57	mg/kg	1	02/21/19 14:22	NV	SW846 3060A/7196A ✖
Redox Potential Vs H2	213		mv	1	02/20/19 14:42	RI	ASTM D1498-76M
Solids, Percent	69.7		%	1	02/20/19 09:00	EB	SM2540 G 18TH ED MOD
pH	6.43		su	1	02/20/19 13:37	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-22(20190219) Lab Sample ID: JC83087-3 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/19/19 Date Received: 02/19/19 Percent Solids: 66.1
---	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 RA	0.61	mg/kg	1	02/21/19 14:31	NV	SW846 3060A/7196A ✖
Redox Potential Vs H2	255		mv	1	02/20/19 14:53	RI	ASTM D1498-76M
Solids, Percent	66.1		%	1	02/20/19 09:00	EB	SM2540 G 18TH ED MOD
pH	6.90		su	1	02/20/19 13:42	RI	SW846 9045D


RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D19	Date Sampled: 02/19/19
Lab Sample ID: JC83087-4	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 RA	0.78	mg/kg	1	02/21/19 14:31	NV	SW846 3060A/7196A 
Redox Potential Vs H2	231		mv	1	02/20/19 14:57	RI	ASTM D1498-76M
Solids, Percent	51.3		%	1	02/20/19 09:00	EB	SM2540 G 18TH ED MOD
pH	6.64		su	1	02/20/19 14:28	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D18		Date Sampled: 02/19/19
Lab Sample ID: JC83087-5		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 74.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 RA	0.54	mg/kg	1	02/21/19 14:31	NV	SW846 3060A/7196A ✚
Redox Potential Vs H2	341		mv	1	02/20/19 14:59	RI	ASTM D1498-76M
Solids, Percent	74		%	1	02/20/19 09:00	EB	SM2540 G 18TH ED MOD
pH	6.59		su	1	02/20/19 14:42	RI	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-C18T	Date Sampled: 02/19/19
Lab Sample ID: JC83087-6	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 68.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 RA	0.58	mg/kg	1	02/21/19 14:31	NV	SW846 3060A/7196A ✖
Redox Potential Vs H2	230		mv	1	02/20/19 15:04	RI	ASTM D1498-76M
Solids, Percent	68.9		%	1	02/20/19 09:00	EB	SM2540 G 18TH ED MOD
pH	7.03		su	1	02/20/19 14:52	RI	SW846 9045D


RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-B18	Date Sampled: 02/19/19
Lab Sample ID: JC83087-2R	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60 RA	0.57	mg/kg	1	02/27/19 15:40	DC	SW846 3060A/7196A 

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B18		Date Sampled: 02/19/19
Lab Sample ID: JC83087-2RT		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.26 J	0.20	%	1	03/04/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	03/04/19 12:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	62300 J	140	mg/kg	1	03/18/19 21:16	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.


RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-22(20190219)	Date Sampled: 02/19/19
Lab Sample ID: JC83087-3R	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 RA	0.61	mg/kg	1	02/27/19 15:45	DC	SW846 3060A/7196A 


RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D19	Date Sampled: 02/19/19
Lab Sample ID: JC83087-4R	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	23.6 RA	0.78	mg/kg	1	02/27/19 15:45	DC	SW846 3060A/7196A 


RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D18	Date Sampled: 02/19/19
Lab Sample ID: JC83087-5R	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 74.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry


Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4 RA	0.54	mg/kg	1	02/27/19 15:45	DC	SW846 3060A/7196A 

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C18T	Date Sampled: 02/19/19
Lab Sample ID: JC83087-6R	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 68.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 RA	0.58	mg/kg	1	02/27/19 15:45	DC	SW846 3060A/7196A 

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FB(20190219)		Date Sampled: 02/19/19
Lab Sample ID: JC83087-1A		Date Received: 02/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12652

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190219)		Date Sampled: 02/19/19
Lab Sample ID: JC83087-1A		Date Received: 02/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/20/19 17:15	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B18		Date Sampled: 02/19/19
Lab Sample ID: JC83087-2A		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	14.1	1.4	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	10.4	5.8	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	14.1	7.2	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12660

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B18	Date Sampled: 02/19/19
Lab Sample ID: JC83087-2A	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 69.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	2.0	mg/kg	1	02/21/19 14:22	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: DUP-22(20190219) Lab Sample ID: JC83087-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/19/19 Date Received: 02/19/19 Percent Solids: 66.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1 UJ-	3.1	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	14.8	1.6	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	28.0 J	6.2	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.0	7.8	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12660

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-22(20190219)	Date Sampled: 02/19/19
Lab Sample ID: JC83087-3A	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.6	2.2	mg/kg	1	02/21/19 14:31	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D19		Date Sampled: 02/19/19
Lab Sample ID: JC83087-4A		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 4.0 UJ-	4.0	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	104	2.0	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	70.2	8.0	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 2.0	2.0	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.6	10	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12660

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D19	Date Sampled: 02/19/19
Lab Sample ID: JC83087-4A	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	103	2.8	mg/kg	1	02/21/19 14:31	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D18		Date Sampled: 02/19/19
Lab Sample ID: JC83087-5A		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 74.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	42.2	1.4	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	8.7	5.5	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.2	6.8	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12660

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D18		Date Sampled: 02/19/19
Lab Sample ID: JC83087-5A		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 74.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	41.3	1.9	mg/kg	1	02/21/19 14:31	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C18T		Date Sampled: 02/19/19
Lab Sample ID: JC83087-6A		Date Received: 02/19/19
Matrix: SO - Soil		Percent Solids: 68.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0 UJ-	3.0	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	14.1	1.5	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	48.6 J	5.9	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.1	7.4	mg/kg	1	02/20/19	02/20/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46182

(2) Prep QC Batch: MP12660

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C18T	Date Sampled: 02/19/19
Lab Sample ID: JC83087-6A	Date Received: 02/19/19
Matrix: SO - Soil	Percent Solids: 68.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	2.1	mg/kg	1	02/21/19 14:31	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC83225, JC83295, JC83296, JC83377, and JC83434

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33163R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC83225, JC83295, JC83296, JC83377, and JC83434 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC83225	FB(20190220)	JC83225-1	Water	2/20/2019		X	X	X
	BS-A17I	JC83225-2	Soil	2/20/2019		X	X	X
JC83295	FB(20190222)	JC83295-1	Water	2/22/2019		X	X	X
	CS-G18	JC83295-2	Soil	2/22/2019		X	X	X
	BS-B17	JC83295-3	Soil	2/22/2019		X	X	X
	BS-C18	JC83295-4	Soil	2/22/2019		X	X	X
JC83296	FB(20190222)-A	JC83296-1	Water	2/22/2019		X	X	X
	SW-A24(0.0-0.5)	JC83296-2	Soil	2/22/2019		X	X	X
	SW-A24(2.0-2.5)	JC83296-3	Soil	2/22/2019		X	X	X
	SW-A25(0.0-0.5)	JC83296-4	Soil	2/22/2019		X	X	X
	SW-A25(2.0-2.5)	JC83296-5	Soil	2/22/2019		X	X	X
	SW-A26(0.0-0.5)	JC83296-6	Soil	2/22/2019		X	X	X
	SW-A26(2.0-2.5)	JC83296-7	Soil	2/22/2019		X	X	X
	DUP-03(20190222)RR	JC83296-8	Soil	2/22/2019	SW-A25(2.0-2.5)	X	X	X
JC83377	FB(20190225)	JC83377-1	Water	2/25/2019		X	X	X
	BS-B3	JC83377-2	Soil	2/25/2019		X	X	X
JC83434	FB(20190226)-A	JC83434-1	Water	2/26/2019		X	X	X
	SW-A27(0.0-0.5)	JC83434-2	Soil	2/26/2019		X	X	X
	SW-A27(2.0-2.5)	JC83434-3	Soil	2/26/2019		X	X	X
	SW-A28(0.0-0.5)	JC83434-4	Soil	2/26/2019		X	X	X
	SW-A28(2.0-2.5)	JC83434-5	Soil	2/26/2019		X	X	X
	SW-A29(0.0-0.5)	JC83434-6	Soil	2/26/2019		X	X	X
	SW-A29(2.0-2.5)	JC83434-7	Soil	2/26/2019		X	X	X
	DUP-04(20190226)RR	JC83434-8	Soil	2/26/2019	SW-A27(2.0-2.5)	X	X	X

DATA REVIEW REPORT

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC83225 and JC83295: Miscellaneous parameters for sample BS-A17I and CS-G18 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC83225, JC83295, and JC83377: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC83296 and JC83434: The MS/MSD analysis performed on sample locations SW-A24(2.0-2.5) and SW-A28(2.0-2.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A24(2.0-2.5)	Antimony	AC (78.6%)	71.4%
	Chromium	< 30%	59.1%
SW-A28(2.0-2.5)	Antimony	69.6%	72.1%

Notes:

AC = Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

DATA REVIEW REPORT

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC83225, JC83295, and JC83377: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC83434: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A28(2.0-2.5). The MS/MSD recoveries exhibited acceptable RPDs.

SDG #JC83296: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A24(2.0-2.5). The MS/MSD recoveries exhibited RPDs greater than the control limit as presented in the following table.

Sample Location	Analytes	MS/MSD RPD
SW-A24(2.0-2.5)	Chromium	42.3%

The criteria used to evaluate MS/MSD RPD are presented in the following table. In the case of a MS/MSD RPD deviation, the sample results are qualified. The qualifications are applied to the all sample results associated with this SDG.

Control Limit	Sample Result	Qualification
> 20% (water) or > 35% (soil)	Non-detect	UJ
	Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A25(2.0-2.5) / DUP-03(20190222)RR	Antimony	3.7	2.7 U	AC
	Vanadium	38.5	33.0	
	Chromium	181	177	2.2%
	Trivalent Chromium	167	163	2.4%
	Nickel	34.5	28.8	18.0%

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A27(2.0-2.5) / DUP-04(20190226)RR	Chromium	16.6	20.2	19.6%
	Trivalent Chromium	15.2	20.2	28.2%
	Nickel	14.3	12.1	AC
	Vanadium	23.5	22.8	

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A25(2.0-2.5) and field duplicate sample DUP-03(20190222)RR were acceptable.

The differences in the results between the parent sample SW-A27(2.0-2.5) and field duplicate sample DUP-04(20190226)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC83225, JC83295, and JC83377: The serial dilution analysis was not performed using a sample from these SDGs.

SDGs #JC83296 and JC83434: The serial dilution analysis performed using samples SW-A24(2.0-2.5) and SW-A28(2.0-2.5) exhibited %D within the control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Holding Time	Criteria
FB(20190220)	Analysis: 32 hours	< 24 hours of receipt by laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

DATA REVIEW REPORT

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC83295, JC83296, JC83377, and JC83434: The MS analysis performed on sample locations CS-G18, SW-A24(2.0-2.5), BS-B3, SW-A28(2.0-2.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC83225, JC83295, JC83296, JC83377, and JC83434: The MS analysis performed on sample locations BS-A17I, CS-G18, SW-A24(2.0-2.5), BS-B3, and SW-A28(2.0-2.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-A17I	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	72.1%	66.8%
CS-G18	Hexavalent Chromium, Soluble	58.2%	< 50%
SW-A24(2.0-2.5)	Hexavalent Chromium, Soluble	< 50%	AC (100.7%)
BS-B3	Hexavalent Chromium, Soluble	69.8%	AC (77.8%)
SW-A28(2.0-2.5)	Hexavalent Chromium, Soluble	< 50%	AC (95.0%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

SDGs #JC83225, JC83295, JC83296, JC83377, and JC83434: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected. Note that the laboratory duplicate analyses results were outside of the acceptance limits in the reanalysis of SDGs #JC83296, JC83377, and JC83434, hence the original analyses of the field samples were marked as usable even though the MS recoveries were acceptable in the reanalyses.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC83225, JC83295, JC83296, JC83377, and JC83434: The PDS analysis performed on sample location BS-A171, CS-G18, SW-A24(2.0-2.5), BS-B3, and SW-A28(2.0-2.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC83225, JC83295, JC83296, and JC83377: The laboratory duplicate analysis performed on sample locations BS-A171, CS-G18, SW-A24(2.0-2.5), and BS-B3 exhibited results within the control limit.

SDG #JC83434: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
SW-A28(2.0-2.5)	Hexavalent Chromium	$>$ \pm RL

DATA REVIEW REPORT

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A25(2.0-2.5) / DUP-03(20190222)RR	Hexavalent Chromium	14.0	14.0	0.0%
SW-A27(2.0-2.5) / DUP-04(20190226)RR	Hexavalent Chromium	1.4	0.47 U	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A25(2.0-2.5) and field duplicate sample DUP-03(20190222)RR were acceptable.

The differences in the results between the parent sample SW-A27(2.0-2.5) and field duplicate sample DUP-04(20190226)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-A17I	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
CS-G18		Analysis: 3 days	
BS-B17			
BS-C18			
SW-A24(0.0-0.5)			
SW-A24(2.0-2.5)			
SW-A25(0.0-0.5)			
SW-A25(2.0-2.5)			
SW-A26(0.0-0.5)			
SW-A26(2.0-2.5)			
DUP-03(20190222)RR			
BS-A17I	ASTM D3872-86	Analysis: 12 days	< 24 hours from collection
CS-G18		Analysis: 24 days	
BS-A17I	SM4500S2-A	Analysis: 12 days	< 7 days from collection
CS-G18		Analysis: 24 days	
CS-G18	Lloyd Kahn	Analysis: 25 days	< 14 days from collection

DATA REVIEW REPORT

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

SDG #JC83225: TOC was detected in the associated method blank; however, the associated sample results were greater than the BAL. No qualification of the sample results was required.

SDG #JC83295: Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC83225, JC83295, and JC83377: The laboratory duplicate analysis was not performed using a sample from these SDGs.

DATA REVIEW REPORT

SDGs #JC83296 and JC83434: The laboratory duplicate analysis performed on sample locations SW-A24(2.0-2.5) and SW-A28(2.0-2.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A25(2.0-2.5) / DUP-03(20190222)RR	Redox	412	458	10.6%
	pH	7.19	7.35	2.2%
SW-A27(2.0-2.5) / DUP-04(20190226)RR	Redox	354	322	9.5%
	pH	7.49	7.31	2.4%

The differences in the results between the parent sample SW-A25(2.0-2.5) and field duplicate sample DUP-03(20190222)RR were acceptable.

The differences in the results between the parent sample SW-A27(2.0-2.5) and field duplicate sample DUP-04(20190226)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 20, 2019

PEER REVIEW: Dennis Capria

DATE: July 12, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

EPN

FED-EX Tracking #
Bottle Order Control # **AK-011719-161**
SGS Quote #
SGS Job # **JC83225**

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes		
Company Name Arcadis		Project Name PPG Jersey City Site 107		<div style="display: flex; justify-content: space-around;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Trivalent Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Hexavalent Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Asbestos</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Nickel</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Thallium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Vanadium</div> </div>										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address 10 Francis Lane Suite 200		Street 18 Chapel Ave.														
City Newtown PA 18440		City Jersey City NJ														
Project Contact Matt Bell		Project # NP000770.0003														
Phone #		Client Purchase Order #														
Sampler(s) Name(s) Christin C. Fell 201.244.8165		Project Manager Jim McLaughlin														
Lab Sample #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	PC	NaOH	HN03	H2SO4	NO3	DI Water	MEDH	ENCORE	LAB USE ONLY
1	FB(20190220)		2/20/19	1600	CC	FB	2									A39
2	BS-A17I		2/20/19	1315	CC	SO	1									G32 C22

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Equis <input type="checkbox"/> Other	2A Initial Assessment Label Verification

Emergency & Rush T/A data available via LabLink

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler: 1	Date Time: 2/21/19 12:35	Received By: 1	Date Time: 2/21/19	Received By: 2	Date Time: 2/21/19
Relinquished by Sampler: 3	Date Time:	Received By: 3	Date Time:	Received By: 4	Date Time:
Relinquished by: 5	Date Time:	Received By: 5	Date Time:	Custody Seal # 31640	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not intact

Preserved where applicable On Ice Cooler Temp **2.0 C-B**

Report of Analysis

Client Sample ID: FB(20190220)	Date Sampled: 02/20/19
Lab Sample ID: JC83225-1	Date Received: 02/21/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.010 UJ	0.010	mg/l	1	02/21/19 23:52	MO	SW846 7196A
Redox Potential Vs H2	392		mv	1	02/22/19 15:42	RI	ASTM D1498-76
pH ^b	5.60		su	1	02/21/19 18:04	SUB	SM4500H+ B-11

(a) Analysis done out of holding time.

(b) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-A17I	Date Sampled: 02/20/19
Lab Sample ID: JC83225-2	Date Received: 02/21/19
Matrix: SO - Soil	Percent Solids: 59.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.91 J-	0.67	mg/kg	1	02/25/19 15:28	DC	SW846 3060A/7196A
Redox Potential Vs H2	174		mv	1	02/22/19 16:44	RI	ASTM D1498-76M
Solids, Percent	59.5		%	1	02/22/19 09:00	EB	SM2540 G 18TH ED MOD
pH	6.72 J		su	1	02/22/19 16:21	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A17I	Date Sampled: 02/20/19
Lab Sample ID: JC83225-2R	Date Received: 02/21/19
Matrix: SO - Soil	Percent Solids: 59.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.67	mg/kg	1	02/27/19 16:41	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A17I		Date Sampled: 02/20/19
Lab Sample ID: JC83225-2RT		Date Received: 02/21/19
Matrix: SO - Soil		Percent Solids: 59.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.4 J	0.20	%	1	03/04/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE U			1	03/04/19 12:00	MP	SM4500S2- A-11
Total Organic Carbon	19200	170	mg/kg	1	03/04/19 16:59	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190220)		Date Sampled: 02/20/19
Lab Sample ID: JC83225-1A		Date Received: 02/21/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/22/19	02/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/22/19	02/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/22/19	02/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/22/19	02/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/22/19	02/22/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46192

(2) Prep QC Batch: MP12696

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190220)	Date Sampled: 02/20/19
Lab Sample ID: JC83225-1A	Date Received: 02/21/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/22/19 18:20	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-A17I		Date Sampled: 02/20/19
Lab Sample ID: JC83225-2A		Date Received: 02/21/19
Matrix: SO - Soil		Percent Solids: 59.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.4	3.4	mg/kg	1	02/21/19	02/22/19	ND SW846 6010D ¹	SW846 3050B ³
Chromium ^a	19.0	5.0	mg/kg	3	02/21/19	02/25/19	ND SW846 6010D ²	SW846 3050B ³
Nickel	16.0	6.7	mg/kg	1	02/21/19	02/22/19	ND SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 5.0	5.0	mg/kg	3	02/21/19	02/25/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	31.0	8.4	mg/kg	1	02/21/19	02/22/19	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46192
- (2) Instrument QC Batch: MA46198
- (3) Prep QC Batch: MP12690

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-A17I		Date Sampled: 02/20/19
Lab Sample ID: JC83225-2A		Date Received: 02/21/19
Matrix: SO - Soil		Percent Solids: 59.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.1	5.7	mg/kg	1	02/25/19 15:28	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



50
PB

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2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsus

E

FEDEX Tracking #	Order Control #
SGS Quota #	SGS Job # JC83295

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes																																
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)										<table border="1"> <tr><td>Total Chromium</td><td>Traceable Chromium</td><td>Tritiated Chromium</td><td>Antimony</td><td>Nickel</td><td>Titanium</td><td>Vanadium</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Total Chromium	Traceable Chromium	Tritiated Chromium	Antimony	Nickel	Titanium	Vanadium										X	X	X	X	X	X	X										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe EB - Fuel Blank EB - Equipment Blank RB - Rise Blank TB - Trip Blank
Total Chromium	Traceable Chromium	Tritiated Chromium	Antimony	Nickel	Titanium	Vanadium																																																
X	X	X	X	X	X	X																																																
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																																																				
City State Zip: Newtown, PA 18440		City State Zip: Jersey City NJ																																																				
Project Contact: Matthew Bell		Project #: NP000770.0003																																																				
Phone #: 610.755.7080		Client Purchase Order #:																																																				
Shipper(s) Name(s): C Buchanan		Project Manager: Jim McLaughlin, Jr.																																																				
Sample #	Field ID / Point of Collection	MECH/VDI Val #	Date	Time	Sampled by	Lab # (UIC/Comp ID)	Matrix	# of bottles	INCO	INHS	INMS	INNE	DI/VA	MECH	ENCODE	LAB USE ONLY																																						
1	FB(20190222)		2/22/19	1300	CB	G	FB	2	1	1	1					X																																						
2	CS-018		2/22/19	1345	CB	G	SO	1								X	A39																																					
3	BS-B17		2/22/19	1345	CB	G	SO	1								X	C20																																					
4	BS-C18 A		2/22/19	1345	CB	G	SO	1								X	D12																																					
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions																																										
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>All data available via L&Blink</small>		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> DOD-QSMS <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP <input checked="" type="checkbox"/> EDD Format_Equib										INITIAL ASSESSMENT 3A LABEL VERIFICATION _____ <small>http://www.sgs.com/terms-and-conditions</small>																																										
Sample Custody must be documented below each time samples change possession, including courier delivery.																																																						
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:																																					
<i>[Signature]</i>	2/27/19 14:00	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59	<i>[Signature]</i>	2/27/19 15:59																																					
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:																																					
5																																																						
Custody Seal # 23208 <input type="checkbox"/> Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Not Intact <input type="checkbox"/> Assent Therm ID: JP 3.24																																																						

5.2
5

Copy of SGS Post Ex Sample COCs Template 20190109



Report of Analysis

Client Sample ID: FB(20190222)	Date Sampled: 02/22/19
Lab Sample ID: JC83295-1	Date Received: 02/22/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/22/19 18:10	DC	SW846 7196A
Redox Potential Vs H2	481		mv	1	02/25/19 09:36	RI	ASTM D1498-76
pH ^a	5.94		su	1	02/22/19 16:14	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-G18	Date Sampled: 02/22/19
Lab Sample ID: JC83295-2	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	13.2 J-	0.52	mg/kg	1	02/26/19 14:09	NV	SW846 3060A/7196A
Redox Potential Vs H2	413		mv	1	02/25/19 13:31	RI	ASTM D1498-76M
Solids, Percent	77.6		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.99 J		su	1	02/25/19 13:06	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B17	Date Sampled: 02/22/19
Lab Sample ID: JC83295-3	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 68.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.8 J-	0.58	mg/kg	1	02/26/19 14:14	NV	SW846 3060A/7196A
Redox Potential Vs H2	293		mv	1	02/25/19 13:40	RI	ASTM D1498-76M
Solids, Percent	68.8		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.63 J		su	1	02/25/19 13:09	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C18	Date Sampled: 02/22/19
Lab Sample ID: JC83295-4	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 61.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.65 UJ-	0.65	mg/kg	1	02/26/19 14:14	NV	SW846 3060A/7196A
Redox Potential Vs H2	290		mv	1	02/25/19 13:44	RI	ASTM D1498-76M
Solids, Percent	61.8		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.19 J		su	1	02/25/19 13:24	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-G18	Date Sampled: 02/22/19
Lab Sample ID: JC83295-2R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	116	2.6	mg/kg	5	03/04/19 10:52	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B17	Date Sampled: 02/22/19
Lab Sample ID: JC83295-3R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 68.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.58	0.58	mg/kg	1	03/04/19 10:52	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C18	Date Sampled: 02/22/19
Lab Sample ID: JC83295-4R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 61.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.65	mg/kg	1	03/04/19 10:52	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190222) Lab Sample ID: JC83295-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46199

(2) Prep QC Batch: MP12719

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190222)	Date Sampled: 02/22/19
Lab Sample ID: JC83295-1A	Date Received: 02/22/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/25/19 17:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-G18		Date Sampled: 02/22/19
Lab Sample ID: JC83295-2A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	288	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.5	5.0	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.0	6.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-G18		Date Sampled: 02/22/19
Lab Sample ID: JC83295-2A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	275	1.8	mg/kg	1	02/26/19 14:09	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B17		Date Sampled: 02/22/19
Lab Sample ID: JC83295-3A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 68.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.6	1.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.7	6.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.1	7.6	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-B17	Date Sampled: 02/22/19
Lab Sample ID: JC83295-3A	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 68.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.8	2.1	mg/kg	1	02/26/19 14:14	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C18	Date Sampled: 02/22/19
Lab Sample ID: JC83295-4A	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 61.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2	3.2	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	62.3	1.6	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.4	6.4	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	8.0	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C18		Date Sampled: 02/22/19
Lab Sample ID: JC83295-4A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 61.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	61.7	2.3	mg/kg	1	02/26/19 14:14	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-G18		Date Sampled: 02/22/19
Lab Sample ID: JC83295-2RT		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.42 J	0.20	%	1	03/18/19 10:20	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/18/19 12:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	183000 J	130	mg/kg	1	03/19/19 23:20	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08510
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsus

E

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	AK-01179-149
	JC83296

Client / Reporting Information		Project Information										Requested Analysis								Matrix Codes		
Company Name: Accadia		Project Name: PPH Jersey City Site 107										<i>Total Chromium</i> <i>Tri-valent Chromium</i> <i>Hexavalent Chromium</i> <i>Asbestos</i> <i>Nickel</i> <i>Thallium</i> <i>Vanadium</i>								DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIG - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address: 10 Fritch Ave		Street: 18 Chapel Ave																				
City, State, Zip: Newark PA 18440		Billing Information (if different from Report to): City, State, Zip: Jersey City NJ										LAB USE ONLY D12 A39 C20										
Project Contact: Matt Bell		Project #: NY007700003																				
Phone #: 610.752.5624		Client Purchase Order #:										Turn Around Time (Business Days): <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other										
Sampler(s) Name(s): Amr Ghali		Project Manager: Jim McCallin																		Deliverable: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DMRP		
Field ID / Point of Collection: FB(20190228)-A		Date, Time, Matrix, # of bottles, etc.										Comments / Special Instructions: INITIAL ASSESSMENT SA ① LABEL VERIFICATION										
MECHDOJ Val #:		Collection:																		Approved by (SGS PM): Approved by (Client): * Approval needed for 1-3 Business Day TAT		
Date:		Date, Time, Matrix, # of bottles, etc.										Sample Custody must be documented below each time samples change possession, including courier delivery.										
Time:		Date, Time, Matrix, # of bottles, etc.																		Requisitioned by: 1 Robert chambers Received by: 2 Robert chambers Requisitioned by: 3 Received by: 4 Custody Seal # 33584 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent Therm. ID: On ice IP Cooler Temp. 3.20C		
Matrix:		Date, Time, Matrix, # of bottles, etc.										http://www.sgs.com/en/terms-and-conditions										
# of bottles:		Date, Time, Matrix, # of bottles, etc.																				
1	FB(20190228)-A		2/21/19	0800	CC	FB	2															
2	SW-A24(0.0-0.5)		2/22/19	0845	CC	SO	1															
3	SW-A24(2.0-2.5)		2/22/19	0835	CC	SO	1															
4	SW-A24(2.0-2.5)MID		2/22/19	0855	CC	SO	1															
5	SW-A25(0.0-0.5)		2/22/19	0905	CC	SO	1															
6	SW-A25(2.0-2.5)		2/22/19	0935	CC	SO	1															
7	SW-A26(0.0-0.5)		2/22/19	0925	CC	SO	1															
8	SW-A26(2.0-2.5)		2/22/19	0935	CC	SO	1															
8	DUP-03(20190228)R		2/22/19	-	CC	SO	1															

EHS-QAC-0023-02-FORM-01-Standard COC.xlsx



5.2
5

Report of Analysis

Client Sample ID: FB(20190222)-A	Date Sampled: 02/22/19
Lab Sample ID: JC83296-1	Date Received: 02/22/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/22/19 18:10	DC	SW846 7196A
Redox Potential Vs H2	489		mv	1	02/25/19 09:39	RI	ASTM D1498-76
pH ^a	4.96		su	1	02/22/19 16:15	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A24(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-2	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.0 J-	0.48	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	389		mv	1	02/25/19 12:06	RI	ASTM D1498-76M
Solids, Percent	83.6		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	5.85 J		su	1	02/25/19 11:59	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A24(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-3	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	44.5 J-	0.52	mg/kg	1	02/26/19 14:10	DC	SW846 3060A/7196A
Redox Potential Vs H2	287		mv	1	02/25/19 11:59	RI	ASTM D1498-76M
Solids, Percent	77.5		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.46 J		su	1	02/25/19 11:47	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A25(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-4	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.8 J-	0.50	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	358		mv	1	02/25/19 12:51	RI	ASTM D1498-76M
Solids, Percent	80.6		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.23 J		su	1	02/25/19 12:06	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A25(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-5	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.0 J-	0.55	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	412		mv	1	02/25/19 12:55	RI	ASTM D1498-76M
Solids, Percent	72.2		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.19 J		su	1	02/25/19 12:51	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A26(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-6	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.3 J-	0.47	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	363		mv	1	02/25/19 13:03	RI	ASTM D1498-76M
Solids, Percent	85		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.85 J		su	1	02/25/19 12:54	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A26(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-7	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	43.4 J-	0.55	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	356		mv	1	02/25/19 13:07	RI	ASTM D1498-76M
Solids, Percent	72.1		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	8.15 J		su	1	02/25/19 12:56	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-03(20190222)RR	Date Sampled: 02/22/19
Lab Sample ID: JC83296-8	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.0 J-	0.55	mg/kg	1	02/26/19 14:17	DC	SW846 3060A/7196A
Redox Potential Vs H2	458		mv	1	02/25/19 13:25	RI	ASTM D1498-76M
Solids, Percent	72.9		%	1	02/24/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.35 J		su	1	02/25/19 13:02	RI	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A24(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-2R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	48.2	0.96	mg/kg	2	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A24(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-3R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	46.2	0.52	mg/kg	1	03/04/19 12:22	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A25(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-4R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0	0.50	mg/kg	1	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A25(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-5R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	71.4	1.1	mg/kg	2	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A26(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-6R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.4	0.47	mg/kg	1	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A26(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-7R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	33.9	0.55	mg/kg	1	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-03(20190222)RR	Date Sampled: 02/22/19
Lab Sample ID: JC83296-8R	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 72.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	16.4	0.55	mg/kg	1	03/04/19 12:29	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190222)-A Lab Sample ID: JC83296-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46199

(2) Prep QC Batch: MP12719

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190222)-A	Date Sampled: 02/22/19
Lab Sample ID: JC83296-1A	Date Received: 02/22/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/25/19 17:56	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A24(0.0-0.5) Lab Sample ID: JC83296-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 83.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	22.9 J	1.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	19.5	4.6	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.4	5.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A24(0.0-0.5)		Date Sampled: 02/22/19
Lab Sample ID: JC83296-2A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.9	1.6	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A24(2.0-2.5) Lab Sample ID: JC83296-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 77.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	743 J	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	62.0	5.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.5	2.5	mg/kg	2	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	85.0	6.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A24(2.0-2.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-3A	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	699	1.8	mg/kg	1	02/26/19 14:10	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A25(0.0-0.5) Lab Sample ID: JC83296-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 80.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	191 J	1.2	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	39.6	4.8	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	54.5	6.0	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A25(0.0-0.5)		Date Sampled: 02/22/19
Lab Sample ID: JC83296-4A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	184	1.7	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A25(2.0-2.5) Lab Sample ID: JC83296-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 72.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.7 J-	2.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	181 J	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	34.5	5.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.7	2.7	mg/kg	2	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.5	6.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A25(2.0-2.5)		Date Sampled: 02/22/19
Lab Sample ID: JC83296-5A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 72.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	167	1.9	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A26(0.0-0.5) Lab Sample ID: JC83296-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 85.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	748 J	1.1	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	126	4.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 5.6	5.6	mg/kg	5	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	223	5.6	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A26(0.0-0.5)	Date Sampled: 02/22/19
Lab Sample ID: JC83296-6A	Date Received: 02/22/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	734	1.6	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A26(2.0-2.5) Lab Sample ID: JC83296-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 72.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	920 J	1.4	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	154	5.5	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.7	2.7	mg/kg	2	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	283	6.9	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A26(2.0-2.5)		Date Sampled: 02/22/19
Lab Sample ID: JC83296-7A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 72.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	877	2.0	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-03(20190222)RR Lab Sample ID: JC83296-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/22/19 Date Received: 02/22/19 Percent Solids: 72.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	177 J	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	28.8	5.4	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.0	6.7	mg/kg	1	02/25/19	02/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46197

(2) Prep QC Batch: MP12717

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-03(20190222)RR		Date Sampled: 02/22/19
Lab Sample ID: JC83296-8A		Date Received: 02/22/19
Matrix: SO - Soil		Percent Solids: 72.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	163	1.9	mg/kg	1	02/26/19 14:17	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



50
FB

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TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/eusa

6

Client / Reporting Information			Project Information			Requested Analysis										Matrix Codes		
Company Name: Arcadis			Project Name: PPG Jersey City Site 107			Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address: 10 Friends Lane Suite 200			Street: 18 Chapel Ave.														LAB USE ONLY	
City: Newtown PA State: PA Zip: 18440			City: Jersey City NJ State: NJ			A39												
Project Contact: Matt Bell			Project #: NP000770.0003			G4												
Phone #:			Client Purchase Order #:			D14												
Signature(s) Name(s): Cherish Craci			Project Manager: Jim Metzger															
SGS Sample #	Field ID / Point of Collection	MEQ/MDI Vol #	Date	Time	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ O ₂	NONE	DI Water	MCH	ENCODE				
1	FB(20190225)		2/25/19	0900	CC	G	FB	2										
2	BS-B3		2/25/19	1215	CC	G	SO	1										
Turn Around Time (Business Days)																		
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other			Approved By (SGS PM) / Date:			<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <i>Egus</i>					Comments / Special Instructions INITIAL ASSESSMENT <i>LC 3A</i> LABEL VERIFICATION _____		
Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions																		
Sample Custody must be documented below each time samples change possession, including courier delivery.																		
Relinquished By: <i>Chris Cofelli</i>	Date / Time: <i>2/25/19 1240</i>	Received By: <i>J Schaal</i>	Date / Time: <i>2/25/19 230</i>	Relinquished By: <i>J Schaal</i>	Date / Time: <i>1700</i>	Received By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Custody Seal # <i>19070</i>	<input type="checkbox"/> Intact	<input type="checkbox"/> Preserved when applicable	Therm. ID: <i>[Signature]</i>	Cooler Temp. °C: <i>[Signature]</i>						
Relinquished By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Relinquished By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Custody Seal # <i>[Signature]</i>	<input type="checkbox"/> Intact	<input type="checkbox"/> Preserved when applicable	Therm. ID: <i>[Signature]</i>	Cooler Temp. °C: <i>[Signature]</i>						
Relinquished By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Relinquished By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date / Time: <i>[Signature]</i>	Custody Seal # <i>[Signature]</i>	<input type="checkbox"/> Intact	<input type="checkbox"/> Preserved when applicable	Therm. ID: <i>[Signature]</i>	Cooler Temp. °C: <i>[Signature]</i>						

5.2
5

eip
37

EHS-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

Report of Analysis

Client Sample ID: FB(20190225)		Date Sampled: 02/25/19
Lab Sample ID: JC83377-1		Date Received: 02/25/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/25/19 22:36	JO	SW846 7196A
Redox Potential Vs H2	458		mv	1	02/26/19 10:09	RI	ASTM D1498-76
pH ^a	5.52		su	1	02/25/19 17:30	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B3	Date Sampled: 02/25/19
Lab Sample ID: JC83377-2	Date Received: 02/25/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9 J-	0.47	mg/kg	1	02/26/19 16:50	DC	SW846 3060A/7196A
Redox Potential Vs H2	483		mv	1	02/26/19 15:41	RI	ASTM D1498-76M
Solids, Percent	85.2		%	1	02/26/19 09:15	EB	SM2540 G 18TH ED MOD
pH	7.54		su	1	02/26/19 15:19	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B3	Date Sampled: 02/25/19
Lab Sample ID: JC83377-2R	Date Received: 02/25/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.47	mg/kg	1	03/07/19 12:53	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190225)		Date Sampled: 02/25/19
Lab Sample ID: JC83377-1A		Date Received: 02/25/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46212

(2) Prep QC Batch: MP12737

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190225)	Date Sampled: 02/25/19
Lab Sample ID: JC83377-1A	Date Received: 02/25/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/26/19 16:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B3		Date Sampled: 02/25/19
Lab Sample ID: JC83377-2A		Date Received: 02/25/19
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	34.0	1.2	mg/kg	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.2	4.7	mg/kg	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.5	5.9	mg/kg	1	02/26/19	02/26/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46212

(2) Prep QC Batch: MP12733

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B3	Date Sampled: 02/25/19
Lab Sample ID: JC83377-2A	Date Received: 02/25/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.1	1.7	mg/kg	1	02/26/19 16:50	DC	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes
Company Name: Arcadis		Project Name: PPG Site 107 (Jersey City)										Requested Analysis										Matrix Codes
Street Address: 10 Friends Lane, Suite 200		Street: 18 Chapel Avenue																				DW - Drinking Water
City, State, Zip: Newtown, PA 18440		City, State: Jersey City NJ																				GW - Ground Water
Project Contact: Matthew Bell		Billing Information (if different from Report to): Company Name																				SW - Surface Water
Phone #: 610.755.7080		Project #: NP000770.0001																				SO - Soil
Sampler(s) Name(s): C Cifalli		Client Purchase Order #																				SL - Sludge
		Project Manager: Jim McLaughlin, Jr.																				SES - Sediment
		Attention																				OI - Oil
																						LIQ - Other Liquid
																						WP - Wipe
																						SOL - Other Solid
																						AER - Air
																						FB - Field Blank
																						EB - Equipment Blank
																						RB - Rinse Blank
																						TB - Trip Blank
																						LAB USE ONLY
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions										
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equival										<input type="checkbox"/> DOD-QSMS
All data available via Lablink		Approval needed for 1-3 Business Day TAT										Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions
Sample Custody must be documented below each time samples change possession, including courier delivery.																						
Received By: <i>[Signature]</i> Date / Time: 2/24/19 1315		Received By: <i>[Signature]</i> Date / Time: 2/26/19 1614										Received By: <i>[Signature]</i> Date / Time: 2/26/19										Received By: <i>[Signature]</i>
Retransmitted By: 3 Date / Time:		Retransmitted By: 4 Date / Time:										Retransmitted By: 4 Date / Time:										Retransmitted By: 4 Date / Time:
Custody Seal # 31672		Intact <input type="checkbox"/> Not intact <input type="checkbox"/>										Preserved where applicable <input type="checkbox"/>										Therm ID: <i>[Signature]</i>

5.2 5

INITIAL ASSESSMENT *[Signature]*
LABEL VERIFICATION _____

Report of Analysis

Client Sample ID: FB(20190226)-A	Date Sampled: 02/26/19
Lab Sample ID: JC83434-1	Date Received: 02/26/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/26/19 21:55	JO	SW846 7196A
Redox Potential Vs H2	730		mv	1	02/27/19 15:36	RI	ASTM D1498-76
pH ^a	5.89		su	1	02/26/19 17:10	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A27(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-2	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.9 J	0.49	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	607		mv	1	02/27/19 16:13	RI	ASTM D1498-76M
Solids, Percent	81		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.05		su	1	02/27/19 15:50	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A27(2.0-2.5)		Date Sampled: 02/26/19
Lab Sample ID: JC83434-3		Date Received: 02/26/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J	0.46	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	354		mv	1	02/27/19 16:30	RI	ASTM D1498-76M
Solids, Percent	87		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.49		su	1	02/27/19 15:53	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A28(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-4	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	13.4 J	0.48	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	529		mv	1	02/27/19 16:36	RI	ASTM D1498-76M
Solids, Percent	83.5		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.43		su	1	02/27/19 15:55	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A28(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-5	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.97 J	0.45	mg/kg	1	03/01/19 15:26	RI	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	02/27/19 15:53	RI	ASTM D1498-76M
Solids, Percent	88.9		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.68		su	1	02/27/19 15:43	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A29(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-6	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.6 J	0.52	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	450		mv	1	02/27/19 17:03	RI	ASTM D1498-76M
Solids, Percent	77.3		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.27		su	1	02/27/19 16:01	RI	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A29(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-7	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82 J	0.46	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	323		mv	1	02/27/19 17:16	RI	ASTM D1498-76M
Solids, Percent	86.1		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.18		su	1	02/27/19 16:05	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-04(20190226)RR	Date Sampled: 02/26/19
Lab Sample ID: JC83434-8	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ	0.47	mg/kg	1	03/01/19 15:33	RI	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	02/27/19 17:19	RI	ASTM D1498-76M
Solids, Percent	85.9		%	1	02/27/19 16:00	SF	SM2540 G 18TH ED MOD
pH	7.31		su	1	02/27/19 16:07	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A27(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-2R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	79.9	2.5	mg/kg	5	03/09/19 14:01	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A27(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-3R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	34.3	0.46	mg/kg	1	03/09/19 14:01	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A28(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-4R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2	0.48	mg/kg	1	03/09/19 14:01	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A28(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-5R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.92	0.45	mg/kg	1	03/09/19 13:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A29(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-6R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.3	0.52	mg/kg	1	03/09/19 14:01	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A29(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-7R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	03/09/19 14:01	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-04(20190226)RR	Date Sampled: 02/26/19
Lab Sample ID: JC83434-8R	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49	0.47	mg/kg	1	03/09/19 14:01	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190226)-A Lab Sample ID: JC83434-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/27/19	02/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/27/19	02/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/27/19	02/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/27/19	02/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/27/19	02/27/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12750

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190226)-A	Date Sampled: 02/26/19
Lab Sample ID: JC83434-1A	Date Received: 02/26/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/27/19 16:19	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A27(0.0-0.5) Lab Sample ID: JC83434-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 81.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	4.5 J-	2.4	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	286	1.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	42.0	4.8	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	40.5	6.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A27(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-2A	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	279	1.7	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A27(2.0-2.5) Lab Sample ID: JC83434-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 87.0
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	02/26/19	02/27/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	16.6	1.2	mg/kg	1	02/26/19	02/27/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.3	4.7	mg/kg	1	02/26/19	02/27/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/26/19	02/27/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	5.9	mg/kg	1	02/26/19	02/27/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A27(2.0-2.5)		Date Sampled: 02/26/19
Lab Sample ID: JC83434-3A		Date Received: 02/26/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.2	1.7	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A28(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-4A	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	227	1.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	24.3	4.7	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	41.3	5.8	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A28(0.0-0.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-4A	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	214	1.7	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A28(2.0-2.5) Lab Sample ID: JC83434-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 88.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.3	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.1	4.3	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.1	5.4	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A28(2.0-2.5)		Date Sampled: 02/26/19
Lab Sample ID: JC83434-5A		Date Received: 02/26/19
Matrix: SO - Soil		Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.3	1.6	mg/kg	1	03/01/19 15:26	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A29(0.0-0.5) Lab Sample ID: JC83434-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 77.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	4.1 J-	2.5	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	146	1.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	23.7	4.9	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.5	2.5	mg/kg	2	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.8	6.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A29(0.0-0.5)		Date Sampled: 02/26/19
Lab Sample ID: JC83434-6A		Date Received: 02/26/19
Matrix: SO - Soil		Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	140	1.7	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A29(2.0-2.5) Lab Sample ID: JC83434-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 86.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.2	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.0	4.5	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	5.6	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A29(2.0-2.5)	Date Sampled: 02/26/19
Lab Sample ID: JC83434-7A	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 86.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.4	1.6	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-04(20190226)RR Lab Sample ID: JC83434-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/26/19 Date Received: 02/26/19 Percent Solids: 85.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	20.2	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.4	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.8	5.5	mg/kg	1	02/26/19	02/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46218

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-04(20190226)RR	Date Sampled: 02/26/19
Lab Sample ID: JC83434-8A	Date Received: 02/26/19
Matrix: SO - Soil	Percent Solids: 85.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.2	1.6	mg/kg	1	03/01/19 15:33	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC83511, JC83512, JC83593, JC83681, and JC83762

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33164R

Review Level: Tier III

Project: NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC83511, JC83512, JC83593, JC83681, and JC83762 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC83511	FB(20190227)-A	JC83511-1	Water	2/27/2019		X	X	X
	SW-A22(0.0-0.5)	JC83511-2	Soil	2/27/2019		X	X	X
	SW-A22(2.0-2.5)	JC83511-2	Soil	2/27/2019		X	X	X
	SW-A23(0.0-0.5)	JC83511-4	Soil	2/27/2019		X	X	X
	SW-A23(2.0-2.5)	JC83511-5	Soil	2/27/2019		X	X	X
	107_M024N_1	JC83511-6	Soil	2/27/2019		X	X	X
	107_M034N	JC83511-7	Soil	2/27/2019		X	X	X
JC83512	FB(20190227)	JC83512-1	Water	2/27/2019		X	X	X
	107_K032	JC83512-2	Soil	2/27/2019		X	X	X
	BS-C17S	JC83512-3	Soil	2/27/2019		X	X	X
JC83593	FB(20190228)	JC83593-1	Water	2/28/2019		X	X	X
	BS-C17TT	JC83593-2	Soil	2/28/2019		X	X	X
JC83681	FB(20190301)	JC83681-1	Water	3/1/2019		X	X	X
	BS-B2	JC83681-2	Soil	3/1/2019		X	X	X
	BS-D18	JC83681-3	Soil	3/1/2019		X	X	X
	BS-D17T	JC83681-4	Soil	3/1/2019		X	X	X
JC83762	FB(20190304)	JC83762-1	Water	3/4/2019		X	X	X
	BS-E18	JC83762-2	Soil	3/4/2019		X	X	X
	BS-E17	JC83762-3	Soil	3/4/2019		X	X	X
	CS-F18	JC83762-4	Soil	3/4/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

4. SDGs #JC83511, JC83512, JC83593, JC83681, and JC83762: Miscellaneous parameters for sample SW-A23(0.0-0.5), BS-C17S, BS-C17TT, BS-B2, and BS-E18 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC83511, JC83512, JC83681, and JC83762: The MS analysis performed on sample locations SW-A23(0.0-0.5), BS-C17S, BS-B2, and BS-E18 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC83511, JC83512, JC83593, JC83681, and JC83762: The MS analysis performed on sample locations SW-A23(0.0-0.5), BS-C17S, BS-C17TT, BS-B2, and BS-E18 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A23(0.0-0.5)	Hexavalent Chromium, Soluble	60.4%	< 50%
BS-C17S	Hexavalent Chromium, Soluble	< 50%	> 125%
BS-C17TT	Hexavalent Chromium, Insoluble	< 50%	< 50%
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-B2	Hexavalent Chromium, Soluble	71.8%	55.4%
BS-E18	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected (“R”); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC83511, JC83512, JC83681, and JC83762: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC83593: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use (“RA” qualifier).

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC83511, JC83593, and JC83681: The PDS analysis performed on sample location SW-A23(0.0-0.5), BS-C17TT, and BS-B2 exhibited recoveries within the control limits.

SDGs #JC83512 and JC83762: The PDS analysis performed on sample locations BS-C17S exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-C17S	Hexavalent Chromium	< 85%	AC (102%)
BS-E18	Hexavalent Chromium	< 85%	< 85%

Notes:

AC = Acceptable

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC83512, JC83593, and JC83681: The laboratory duplicate analysis performed on sample locations BS-C17S, BS-C17TT, and BS-B2 exhibited results within the control limit.

SDGs #JC83511 and JC83762: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

DATA REVIEW REPORT

Sample Location	Analytes	Laboratory Duplicate RPD
SW-A23(0.0-0.5)	Hexavalent Chromium	32.7%
BS-E18	Hexavalent Chromium	> ± RL

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-C17TT BS-E18 BS-E17 CS-F18	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-B2 BS-D18 BS-D17T		Analysis: 6 days	
SW-A23(0.0-0.5) BS-E18 BS-B2 BS-C17TT BS-C17S	ASTM D3872-86	Analysis: 24 days	< 24 hours from collection
		Analysis: 25 days	
		Analysis: 28 days	
		Analysis: 29 days	
		Analysis: 30 days	
SW-A23(0.0-0.5) BS-E18 BS-B2 BS-C17TT	SM4500S2-A	Analysis: 24 days	< 7 days from collection
		Analysis: 25 days	
		Analysis: 28 days	
		Analysis: 29 days	

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
BS-C17S		Analysis: 30 days	
SW-A23(0.0-0.5)	Lloyd Kahn	Analysis: 23 days	< 14 days from collection
BS-C17S		Analysis: 25 days	
BS-E18		Analysis: 28 days	
BS-B2		Analysis: 29 days	
BS-C17TT			

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

SDGs #JC83511, JC83512, and JC83593: TOC was detected in the associated method blank; however, the associated sample results were greater than the BAL. No qualification of the sample results was required.

SDGs #JC83681 and JC83762: Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

DATA REVIEW REPORT

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC83511: The laboratory duplicate analysis performed on sample locations SW-A22(0.0-0.5) exhibited results within the control limit.

SDGs #JC83512, JC83593, JC83681, and JC83762: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: June 20, 2019

PEER REVIEW: Dennis Capria

DATE: July 12, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL 732-329-0200 FAX 732-329-3499
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E

FED-EX Tracking #	Bottle Order/Control #
SGS Quote #	SGS Job #
	JC83511

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)										Matrix Codes				
Company Name Arcadis		Project Name PP6 Site 107 (Jersey City)										Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Tantalum Niobium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB-Field Blank EB- Equipment Blank RB- Rinse Blank TB-Trip Blank				
Street Address 10 Friends Lane, Site 20		Street 18 Chapel Avenue																								
City Newtown, PA		City Jersey City, NJ																								
State PA		State NJ																								
Zip 18440		Zip 07310																								
Project Contact Matthew Bell		Project # NP000770.0003																								
Phone # 610-755-7060		Client Purchase Order #																								
Sampler(s) Name(s) C Cibelli		Project Manager Jim McLaughlin, Jr.																								
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles										LAB USE ONLY
																HCl, HNO3, H2O2, H2SO4, HClO4, DI Water, MEOH, ENCORE										
1		FB(20190222)-A				2/27/19		1240		CC		FB		2												All
2		SW-A22(0.0-0.5)				2/27/19		1245		CC		SO		1												G18
3		SW-A22(2.0-2.5)				2/27/19		1255		CC		SO		1												D26
4		SW-A23(0.0-0.5)				2/27/19		1305		CC		SO		1												
5		SW-A23(1.0-2.3)				2/27/19		1315		CC		SO		1												
6		107-M024N-1				2/27/19		1325		CC		SO		1												
7		107-M034N				2/27/19		1335		CC		SO		1												

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions																			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date: _____ _____ _____ _____ _____ _____										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input type="checkbox"/> EDD Format <input type="checkbox"/> Other _____									
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory is verified upon receipt in the Laboratory																			

Relinquished by Sampler:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:	
1		2/27/19 1357		1 Schen		2/27/19 1358		2 Schen		2/27/19		1820		2	
3				3				4				4			
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:	
5				5				18364				Cooler Temp.		34	

Report of Analysis

Client Sample ID: FB(20190227)-A	Date Sampled: 02/27/19
Lab Sample ID: JC83511-1	Date Received: 02/27/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/27/19 22:28	JO	SW846 7196A
Redox Potential Vs H2	461		mv	1	02/28/19 09:25	RI	ASTM D1498-76
pH ^a	4.48		su	1	02/27/19 19:05	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A22(0.0-0.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-2	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.1 J	0.56	mg/kg	1	03/05/19 12:34	RI	SW846 3060A/7196A
Redox Potential Vs H2	488		mv	1	02/28/19 16:17	RI	ASTM D1498-76M
Solids, Percent	70.9		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	7.88		su	1	02/28/19 15:50	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A22(2.0-2.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-3	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	45.4 J	0.59	mg/kg	1	03/05/19 12:34	RI	SW846 3060A/7196A
Redox Potential Vs H2	460		mv	1	02/28/19 16:31	RI	ASTM D1498-76M
Solids, Percent	67.5		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	8.04		su	1	02/28/19 15:55	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A23(0.0-0.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-4	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	17.4 J	0.48	mg/kg	1	03/05/19 12:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	449		mv	1	02/28/19 16:36	RI	ASTM D1498-76M
Solids, Percent	82.7		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	7.44		su	1	02/28/19 15:58	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A23(2.0-2.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-5	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	46.1 J	0.52	mg/kg	1	03/05/19 12:34	RI	SW846 3060A/7196A
Redox Potential Vs H2	369		mv	1	02/28/19 16:44	RI	ASTM D1498-76M
Solids, Percent	77		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	9.05		su	1	02/28/19 16:02	RI	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: 107_M024N_1	Date Sampled: 02/27/19
Lab Sample ID: JC83511-6	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	47.7 J	1.0	mg/kg	2	03/05/19 12:34	RI	SW846 3060A/7196A
Redox Potential Vs H2	443		mv	1	02/28/19 16:50	RI	ASTM D1498-76M
Solids, Percent	77.5		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	7.73		su	1	02/28/19 16:05	RI	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 02/27/19
Lab Sample ID: JC83511-7	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ	0.46	mg/kg	1	03/05/19 12:34	RI	SW846 3060A/7196A
Redox Potential Vs H2	445		mv	1	02/28/19 16:53	RI	ASTM D1498-76M
Solids, Percent	86.5		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	7.81		su	1	02/28/19 16:08	RI	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A22(0.0-0.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-2R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	20.3	0.56	mg/kg	1	03/18/19 13:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A22(2.0-2.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-3R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	63.8	1.2	mg/kg	2	03/18/19 13:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A23(0.0-0.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-4R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	11.2	0.48	mg/kg	1	03/18/19 13:47	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A23(0.0-0.5)		Date Sampled: 02/27/19
Lab Sample ID: JC83511-4RT		Date Received: 02/27/19
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.99 J	0.20	%	1	03/23/19 09:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/23/19 11:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	169000 J	120	mg/kg	1	03/22/19 20:49	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A23(2.0-2.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-5R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.3	0.52	mg/kg	1	03/18/19 13:51	RI	SW846 3066A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M024N_1	Date Sampled: 02/27/19
Lab Sample ID: JC83511-6R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	20.3	0.52	mg/kg	1	03/18/19 13:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 02/27/19
Lab Sample ID: JC83511-7R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	03/18/19 13:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190227)-A	Date Sampled: 02/27/19
Lab Sample ID: JC83511-1A	Date Received: 02/27/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46229

(2) Prep QC Batch: MP12775

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190227)-A	Date Sampled: 02/27/19
Lab Sample ID: JC83511-1A	Date Received: 02/27/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/28/19 17:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A22(0.0-0.5) Lab Sample ID: JC83511-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: 70.9
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	925	1.4	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Nickel	193	5.5	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 4.1	4.1	mg/kg	3	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	295	6.8	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46226
- (2) Instrument QC Batch: MA46229
- (3) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A22(0.0-0.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-2A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	906	2.0	mg/kg	1	03/05/19 12:34	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A22(2.0-2.5) Lab Sample ID: JC83511-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: 67.5
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 15	15	mg/kg	5	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Chromium	2420	7.3	mg/kg	5	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Nickel	384	5.9	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 7.3	7.3	mg/kg	5	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Vanadium ^a	554	37	mg/kg	5	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA46226
- (2) Instrument QC Batch: MA46229
- (3) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A22(2.0-2.5)		Date Sampled: 02/27/19
Lab Sample ID: JC83511-3A		Date Received: 02/27/19
Matrix: SO - Soil		Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	2370	7.9	mg/kg	1	03/05/19 12:34	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A23(0.0-0.5) Lab Sample ID: JC83511-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: 82.7
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	214	1.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	34.7	4.6	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	44.9	5.8	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46226

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A23(0.0-0.5)		Date Sampled: 02/27/19
Lab Sample ID: JC83511-4A		Date Received: 02/27/19
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	197	1.7	mg/kg	1	03/05/19 12:29	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A23(2.0-2.5) Lab Sample ID: JC83511-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: 77.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	687	1.4	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	74.0	5.5	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	117	6.8	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46226

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A23(2.0-2.5)	Date Sampled: 02/27/19
Lab Sample ID: JC83511-5A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	641	1.9	mg/kg	1	03/05/19 12:34	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M024N_1 Lab Sample ID: JC83511-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: 77.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Chromium	564	1.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Nickel	56.9	5.0	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.5	2.5	mg/kg	2	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	94.3	6.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46226
- (2) Instrument QC Batch: MA46229
- (3) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 107_M024N_1	Date Sampled: 02/27/19
Lab Sample ID: JC83511-6A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	516	2.2	mg/kg	1	03/05/19 12:34	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 02/27/19
Lab Sample ID: JC83511-7A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.2	1.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.5	4.7	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	5.9	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46226

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 107_M034N	Date Sampled: 02/27/19
Lab Sample ID: JC83511-7A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.2	1.7	mg/kg	1	03/05/19 12:34	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

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E

Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: PA Zip: 18440		Project Information Project Name: PPG Site 107 (Jersey City) Street: 18 Chapel Avenue Billing Information (if different from report to): City: Jersey City State: NJ Company Name:		FED-EX Tracking # SGS Order # Bottle Order Control # SGS Job # JC83512										Requested Analysis Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																																																																																																						
Project Contact: Matthew Ball E-mail: Phone # 610.755.7080		Project # NP000770.0003 Street Address: Client Purchase Order # City State Zip		Sample(s) Name(s): C Buchanan Phone # Project Manager: Jim McLaughlin, Jr. Alteration:		Collection: <table border="1"> <thead> <tr> <th rowspan="2">Site #</th> <th rowspan="2">Field ID / Point of Collection</th> <th rowspan="2">MECH#</th> <th rowspan="2">Date</th> <th rowspan="2">Time</th> <th rowspan="2">Sampled by</th> <th rowspan="2">Lab # (Cont.)</th> <th rowspan="2">Matrix</th> <th rowspan="2"># of bottles</th> <th colspan="7">Number of preserved bottles</th> <th rowspan="2">Total Chromium</th> <th rowspan="2">Hexavalent Chromium</th> <th rowspan="2">Trivalent Chromium</th> <th rowspan="2">Antimony</th> <th rowspan="2">Nickel</th> <th rowspan="2">Thallium</th> <th rowspan="2">Vanadium</th> <th rowspan="2">LAB USE ONLY</th> </tr> <tr> <th>MECH</th> <th>HAZ</th> <th>LAB</th> <th>MON</th> <th>TOX</th> <th>ENH</th> <th>EM</th> <th>EN</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>FB(20190227)</td> <td></td> <td>2/27/19</td> <td>1240</td> <td>CB</td> <td></td> <td>FB</td> <td>2</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td></td> </tr> <tr> <td>2</td> <td>107-K32</td> <td></td> <td>2/27/19</td> <td>1330</td> <td>CB</td> <td></td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td></td> <td>All</td> </tr> <tr> <td>3</td> <td>BS-C175</td> <td></td> <td>2/27/19</td> <td>1340</td> <td>CB</td> <td></td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> <td></td> <td>G18</td> </tr> </tbody> </table>										Site #	Field ID / Point of Collection	MECH#	Date	Time	Sampled by	Lab # (Cont.)	Matrix	# of bottles	Number of preserved bottles							Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY	MECH	HAZ	LAB	MON	TOX	ENH	EM	EN	1	FB(20190227)		2/27/19	1240	CB		FB	2		1					Y	Y	Y	Y	Y	Y	Y		2	107-K32		2/27/19	1330	CB		SO	1						Y	Y	Y	Y	Y	Y	Y		All	3	BS-C175		2/27/19	1340	CB		SO	1						Y	Y	Y	Y	Y	Y	Y		G18
Site #	Field ID / Point of Collection	MECH#	Date	Time	Sampled by	Lab # (Cont.)	Matrix	# of bottles	Number of preserved bottles																Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium									LAB USE ONLY																																																																												
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1	FB(20190227)		2/27/19	1240	CB		FB	2		1					Y	Y	Y	Y	Y	Y	Y																																																																																															
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3	BS-C175		2/27/19	1340	CB		SO	1						Y	Y	Y	Y	Y	Y	Y		G18																																																																																														
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other				Approved by (SGS PM) / Date:				Deliverable: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DWQP				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT MCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format, Epiq...				Comments / Special Instructions INITIAL ASSESSMENT 3A LABEL VERIFICATION																																																																																																				
Sample Custody must be documented below each time samples change possession, including courier delivery.																																																																																																																				
Requisitioned by: <i>[Signature]</i> Date / Time: 2/27/19 1430			Received By: <i>[Signature]</i> Date / Time: 2/27/19 430			Requisitioned By: <i>[Signature]</i> Date / Time: 2/27/19 1820			Received By: <i>[Signature]</i> Date / Time: 2/27/19 1820			Requisitioned by: <i>[Signature]</i> Date / Time:			Received By: <i>[Signature]</i> Date / Time:																																																																																																					
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5.2
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SGS

Report of Analysis

Client Sample ID: FB(20190227) Lab Sample ID: JC83512-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 02/27/19 Date Received: 02/27/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/27/19 22:32	JO	SW846 7196A
Redox Potential Vs H2	473		mv	1	02/28/19 09:28	RI	ASTM D1498-76
pH ^a	4.46		su	1	02/27/19 19:10	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107_K032	Date Sampled: 02/27/19
Lab Sample ID: JC83512-2	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59 UJ-	0.59	mg/kg	1	03/06/19 17:58	NV	SW846 3060A/7196A
Redox Potential Vs H2	185		mv	1	02/28/19 17:11	RI	ASTM D1498-76M
Solids, Percent	68.1		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	6.89		su	1	02/28/19 16:13	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17S	Date Sampled: 02/27/19
Lab Sample ID: JC83512-3	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 73.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	76.5 J-	2.7	mg/kg	5	03/06/19 17:58	NV	SW846 3060A/7196A
Redox Potential Vs H2	319		mv	1	02/28/19 17:16	RI	ASTM D1498-76M
Solids, Percent	73.8		%	1	03/01/19 09:23	RC	SM2540 G 18TH ED MOD
pH	7.45		su	1	02/28/19 16:17	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_K032	Date Sampled: 02/27/19
Lab Sample ID: JC83512-2R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	03/19/19 16:32	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C17S	Date Sampled: 02/27/19
Lab Sample ID: JC83512-3R	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 73.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	45.9	1.1	mg/kg	2	03/19/19 16:32	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17S		Date Sampled: 02/27/19
Lab Sample ID: JC83512-3RT		Date Received: 02/27/19
Matrix: SO - Soil		Percent Solids: 73.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.22 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	89500 J	140	mg/kg	1	03/22/19 17:17	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190227)		Date Sampled: 02/27/19
Lab Sample ID: JC83512-1A		Date Received: 02/27/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	02/28/19	02/28/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46229

(2) Prep QC Batch: MP12775

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190227)		Date Sampled: 02/27/19
Lab Sample ID: JC83512-1A		Date Received: 02/27/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	02/28/19 17:53	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107-K32	Date Sampled: 02/27/19
Lab Sample ID: JC83512-2A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.9	1.5	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	6.1	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.1	7.6	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46226

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107-K32		Date Sampled: 02/27/19
Lab Sample ID: JC83512-2A		Date Received: 02/27/19
Matrix: SO - Soil		Percent Solids: 68.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.9	2.1	mg/kg	1	03/06/19 17:58	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17S	Date Sampled: 02/27/19
Lab Sample ID: JC83512-3A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 73.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 5.2	5.2	mg/kg	2	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Chromium	1320	2.6	mg/kg	2	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³
Nickel	20.0	5.2	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.3	1.3	mg/kg	1	02/27/19	02/28/19 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium ^a	24.1	13	mg/kg	2	02/27/19	02/28/19 ND	SW846 6010D ²	SW846 3050B ³

- (1) Instrument QC Batch: MA46226
- (2) Instrument QC Batch: MA46229
- (3) Prep QC Batch: MP12752

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-C17S	Date Sampled: 02/27/19
Lab Sample ID: JC83512-3A	Date Received: 02/27/19
Matrix: SO - Soil	Percent Solids: 73.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1240	5.3	mg/kg	1	03/06/19 17:58	NV	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FEDEX Tracking #
Bottle Order Control # AK-011719-167
SGS Order # JCS83593

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, Comments / Special Instructions, Sample Custody tracking table, and Lab Use Only section.

5.2
5



Report of Analysis

Client Sample ID: FB(20190228)	Date Sampled: 02/28/19
Lab Sample ID: JC83593-1	Date Received: 02/28/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	02/28/19 22:11	JO	SW846 7196A
Redox Potential Vs H2	430		mv	1	03/03/19 11:20	JOO	ASTM D1498-76
pH ^a	4.47		su	1	02/28/19 19:03	AS	SM4500H+ B-11


(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C17TT	Date Sampled: 02/28/19
Lab Sample ID: JC83593-2	Date Received: 02/28/19
Matrix: SO - Soil	Percent Solids: 65.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.61 RA	0.61	mg/kg	1	03/06/19 17:40	JOO	SW846 3060A/7196A 
Redox Potential Vs H2	214		mv	1	03/03/19 11:13	JOO	ASTM D1498-76M
Solids, Percent	65.4		%	1	03/01/19 09:12	RC	SM2540 G 18TH ED MOD
pH	6.66 J		su	1	03/03/19 11:13	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17TT	Date Sampled: 02/28/19
Lab Sample ID: JC83593-2R	Date Received: 02/28/19
Matrix: SO - Soil	Percent Solids: 65.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 RA	0.61	mg/kg	1	03/19/19 15:18	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-C17TT		Date Sampled: 02/28/19
Lab Sample ID: JC83593-2RT		Date Received: 02/28/19
Matrix: SO - Soil		Percent Solids: 65.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.2 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 ^R
Total Organic Carbon ^c	36200 J	150	mg/kg	1	03/22/19 11:36	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190228)		Date Sampled: 02/28/19
Lab Sample ID: JC83593-1A		Date Received: 02/28/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/01/19	03/01/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/01/19	03/01/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/01/19	03/01/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/01/19	03/01/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/01/19	03/01/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46234

(2) Prep QC Batch: MP12803

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190228)	Date Sampled: 02/28/19
Lab Sample ID: JC83593-1A	Date Received: 02/28/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/01/19 16:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C17TT		Date Sampled: 02/28/19
Lab Sample ID: JC83593-2A		Date Received: 02/28/19
Matrix: SO - Soil		Percent Solids: 65.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	02/28/19	03/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	34.5	1.5	mg/kg	1	02/28/19	03/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.4	5.9	mg/kg	1	02/28/19	03/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	02/28/19	03/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.6	7.4	mg/kg	1	02/28/19	03/01/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46234

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17TT	Date Sampled: 02/28/19
Lab Sample ID: JC83593-2A	Date Received: 02/28/19
Matrix: SO - Soil	Percent Solids: 65.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.5	2.1	mg/kg	1	03/06/19 17:40	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehusa

E

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes										
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)										FED-EX Tracking #										Bottle Order Control #										
Street Address 10 Friends Lane, Suite 200		Street 18 Chapel Avenue										SGS Quote #										SGS Job #										
City State Zip Newtown, PA 18440		City State Company Name Jersey City NJ										Billing Information (if different from Report to)										Matrix Codes										
Project Contact Matthew Ball		Project # NP000770.0001										Street Address										DW - Drinking Water GW - Ground Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste EB - Field Blank EB-Equipment Blank RB - Rinse Blank TB - Trip Blank										
Phone # 610.755.7080		Client Purchase Order #										City State Zip										LAB USE ONLY										
Sampler(s) Name(s) C Buchanan		Project Manager Jim McLaughlin, Jr.										Attention:																				
Lot #	Field ID / Point of Collection	MEQHD/Var #	Date	Time	Collection	Sampled by	Lab (to Contain)	Matrix	# of bottles	USE	NOX	PH	AMNH	NO3	NO2	DRINK	ENFORCE	Total Chromium	Hexavalent Chromium	Treatment Chromium	Antimony	Nickel	Thallium	Vanadium								
1	FB(20190301)		3/1/19	1340	CB	G	PB	2										X	X	X	X	X	X	X								
2	BS-B2		3/1/19	1400	CB	G	SO	1										X	X	X	X	X	X	X	19-11							
3	BS-D18		3/1/19	1320	CB	G	SO	1										X	X	X	X	X	X	X	613							
4	BS-B17T		3/1/19	1315	CB	G	SO	1										X	X	X	X	X	X	X								
Turn Around Time (Business Days)		Approved by (SGS PM) / Date:										Deliverable										Comments / Special Instructions										
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approval needed for 1-3 Business Day TAT										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equib										INITIAL ASSESSMENT <u>3A DM</u> LABEL VERIFICATION _____
Requisitioned by: <i>[Signature]</i>		Date / Time: <i>3/1/19 14:44</i>										Requisitioned by: <i>Tschirmer</i>										Date / Time: <i>3/1/19 11:00</i>										
Requisitioned by: <i>[Signature]</i>		Date / Time: <i>3/1/19</i>										Requisitioned by: <i>Tschirmer</i>										Date / Time: <i>3/1/19</i>										
Requisitioned by: <i>[Signature]</i>		Date / Time: <i>3/1/19</i>										Requisitioned by: <i>[Signature]</i>										Date / Time: <i>3/1/19</i>										
Custody seal #		User										Preserved when applicable										Therm. ID										
33200		No contact										Assent										Code/Temp. C										

5.2
5

EA
3.7



Report of Analysis

Client Sample ID: FB(20190301) Lab Sample ID: JC83681-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/01/19 Date Received: 03/01/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/01/19 21:18	JO	SW846 7196A
Redox Potential Vs H2	505		mv	1	03/06/19 17:15	EB	ASTM D1498-76
pH ^a	5.91		su	1	03/01/19 19:00	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B2	Date Sampled: 03/01/19
Lab Sample ID: JC83681-2	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.3 J-	0.45	mg/kg	1	03/08/19 16:56	RI	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	03/07/19 00:01	EB	ASTM D1498-76M
Solids, Percent	88.3		%	1	03/04/19 09:36	RC	SM2540 G 18TH ED MOD
pH	8.09 J		su	1	03/07/19 23:57	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D18	Date Sampled: 03/01/19
Lab Sample ID: JC83681-3	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.67 UJ-	0.67	mg/kg	1	03/08/19 16:58	RI	SW846 3060A/7196A
Redox Potential Vs H2	451		mv	1	03/07/19 00:04	EB	ASTM D1498-76M
Solids, Percent	59.7		%	1	03/04/19 09:36	RC	SM2540 G 18TH ED MOD
pH	6.88 J		su	1	03/07/19 00:02	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D17T	Date Sampled: 03/01/19
Lab Sample ID: JC83681-4	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	23.0 J-	0.56	mg/kg	1	03/08/19 16:58	RI	SW846 3060A/7196A
Redox Potential Vs H2	305		mv	1	03/07/19 00:11	EB	ASTM D1498-76M
Solids, Percent	71.9		%	1	03/04/19 09:36	RC	SM2540 G 18TH ED MOD
pH	6.49 J		su	1	03/07/19 00:11	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B2	Date Sampled: 03/01/19
Lab Sample ID: JC83681-2R	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.2	0.45	mg/kg	1	03/22/19 11:50	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D18	Date Sampled: 03/01/19
Lab Sample ID: JC83681-3R	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.67	0.67	mg/kg	1	03/22/19 11:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D17T	Date Sampled: 03/01/19
Lab Sample ID: JC83681-4R	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	03/22/19 11:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190301) Lab Sample ID: JC83681-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/01/19 Date Received: 03/01/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/02/19	03/04/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/02/19	03/04/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/02/19	03/04/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/02/19	03/04/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/02/19	03/04/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46240

(2) Prep QC Batch: MP12826

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190301)	Date Sampled: 03/01/19
Lab Sample ID: JC83681-1A	Date Received: 03/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/04/19 14:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B2	
Lab Sample ID: JC83681-2A	Date Sampled: 03/01/19
Matrix: SO - Soil	Date Received: 03/01/19
	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	112	1.1	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.1	4.4	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	37.8	5.6	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46240

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B2	Date Sampled: 03/01/19
Lab Sample ID: JC83681-2A	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	104	1.6	mg/kg	1	03/08/19 16:56	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D18		Date Sampled: 03/01/19
Lab Sample ID: JC83681-3A		Date Received: 03/01/19
Matrix: SO - Soil		Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.4	3.4	mg/kg	1	03/02/19	03/04/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	76.3	1.7	mg/kg	1	03/02/19	03/04/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	21.2	6.7	mg/kg	1	03/02/19	03/04/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.7	1.7	mg/kg	1	03/02/19	03/04/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	20.2	8.4	mg/kg	1	03/02/19	03/04/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46240

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D18	Date Sampled: 03/01/19
Lab Sample ID: JC83681-3A	Date Received: 03/01/19
Matrix: SO - Soil	Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	76.3	2.4	mg/kg	1	03/08/19 16:58	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D17T		Date Sampled: 03/01/19
Lab Sample ID: JC83681-4A		Date Received: 03/01/19
Matrix: SO - Soil		Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.8	1.4	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.5	5.6	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.4	7.0	mg/kg	1	03/02/19	03/04/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46240

(2) Prep QC Batch: MP12752

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D17T		Date Sampled: 03/01/19
Lab Sample ID: JC83681-4A		Date Received: 03/01/19
Matrix: SO - Soil		Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 2.0	2.0	mg/kg	1	03/08/19 16:58	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-B2		Date Sampled: 03/01/19
Lab Sample ID: JC83681-2RT		Date Received: 03/01/19
Matrix: SO - Soil		Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.47 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	8350 J	110	mg/kg	1	03/29/19 16:55	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4



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TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehusa

E

Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane, Suite 200 City: Newtown, PA State: PA Zip: 18840 Project Contact: Matthew Bell Email: Phone #: 610.755.7080 Samplers (Name(s)): C Buchanan Phone #: Project Manager: Jim McLaughlin, Jr. Attention:		Project Information Project Name: PPG Site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Zip: Project #: NP000770 0001 Client Purchase Order #: City: State: Zip: Attention:		Requested Analysis Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank LAB USE ONLY A38 C18 D16									
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>All data available via Lablink</small>		Approved By (SGS PM) / Date: _____ Approval needed for 1-3 Business Day TAT		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format_Equale						Comments / Special Instructions http://www.sgs.com/en/usa/our_capabilities			
Requisitioned by: <i>[Signature]</i> Date / Time: 3/4/19 1320		Received by: <i>[Signature]</i> Date / Time: 3		Requisitioned by: <i>[Signature]</i> Date / Time: 3/4/19 1530		Received by: <i>[Signature]</i> Date / Time: 4		Requisitioned by: 5 Date / Time: 5		Received by: 5 Date / Time: 5			
Requisitioned by: 5		Received by: 5		Requisitioned by: 5		Received by: 5		Requisitioned by: 5		Received by: 5			

INITIAL ASSESSMENT *[Signature]*
LABEL VERIFICATION _____

5.2
5

SGS Post Ex Sample COCs Template 20190109.xlsx



Report of Analysis

Client Sample ID: FB(20190304) Lab Sample ID: JC83762-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/04/19 Date Received: 03/04/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/04/19 21:28	JO	SW846 7196A
Redox Potential Vs H2	400		mv	1	03/06/19 17:19	EB	ASTM D1498-76
pH ^a	5.75		su	1	03/04/19 16:20	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E18		Date Sampled: 03/04/19
Lab Sample ID: JC83762-2		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.54	mg/kg	1	03/09/19 10:54	RI	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	03/07/19 00:13	EB	ASTM D1498-76M
Solids, Percent	73.9		%	1	03/05/19 17:30	BG	SM2540 G 18TH ED MOD
pH	7.89 J		su	1	03/07/19 00:13	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/04/19
Lab Sample ID: JC83762-3	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 53.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.75 UJ-	0.75	mg/kg	1	03/09/19 10:58	RI	SW846 3060A/7196A
Redox Potential Vs H2	339		mv	1	03/07/19 00:20	EB	ASTM D1498-76M
Solids, Percent	53.2		%	1	03/05/19 17:30	BG	SM2540 G 18TH ED MOD
pH	6.92 J		su	1	03/07/19 00:15	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-F18	Date Sampled: 03/04/19
Lab Sample ID: JC83762-4	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.62 UJ-	0.62	mg/kg	1	03/09/19 10:58	RI	SW846 3060A/7196A
Redox Potential Vs H2	339		mv	1	03/07/19 00:23	EB	ASTM D1498-76M
Solids, Percent	64.4		%	1	03/05/19 17:30	BG	SM2540 G 18TH ED MOD
pH	7.80 J		su	1	03/07/19 00:17	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E18	Date Sampled: 03/04/19
Lab Sample ID: JC83762-2R	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76	0.54	mg/kg	1	03/22/19 12:48	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/04/19
Lab Sample ID: JC83762-3R	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 53.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.75	mg/kg	1	03/22/19 12:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-F18	Date Sampled: 03/04/19
Lab Sample ID: JC83762-4R	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	20.0	0.62	mg/kg	1	03/22/19 12:51	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190304)		Date Sampled: 03/04/19
Lab Sample ID: JC83762-1A		Date Received: 03/04/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46248

(2) Prep QC Batch: MP12856

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190304)	Date Sampled: 03/04/19
Lab Sample ID: JC83762-1A	Date Received: 03/04/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/05/19 17:09	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E18		Date Sampled: 03/04/19
Lab Sample ID: JC83762-2A		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	78.6	1.3	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	520	5.2	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.9	6.5	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46248

(2) Prep QC Batch: MP12851

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E18		Date Sampled: 03/04/19
Lab Sample ID: JC83762-2A		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	77.2	1.8	mg/kg	1	03/09/19 10:54	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17		Date Sampled: 03/04/19
Lab Sample ID: JC83762-3A		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 53.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.6	3.6	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	129	1.8	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	77.6	7.2	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.8	1.8	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	72.7	9.0	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46248

(2) Prep QC Batch: MP12851

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E17		Date Sampled: 03/04/19
Lab Sample ID: JC83762-3A		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 53.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	129	2.6	mg/kg	1	03/09/19 10:58	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-F18		Date Sampled: 03/04/19
Lab Sample ID: JC83762-4A		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	84.8	4.6	mg/kg	3	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	2810	18	mg/kg	3	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 4.6	4.6	mg/kg	3	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.6	7.7	mg/kg	1	03/05/19	03/05/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46248

(2) Prep QC Batch: MP12851

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-F18	Date Sampled: 03/04/19
Lab Sample ID: JC83762-4A	Date Received: 03/04/19
Matrix: SO - Soil	Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	84.8	5.2	mg/kg	1	03/09/19 10:58	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E18		Date Sampled: 03/04/19
Lab Sample ID: JC83762-2RT		Date Received: 03/04/19
Matrix: SO - Soil		Percent Solids: 73.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	126000 J	140	mg/kg	1	03/29/19 22:28	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC83998, JC84093, and JC84109

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33442R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC83998, JC84093, and JC84109 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC83998	FB(20190307)	JC83998-1	Water	3/7/2019		X	X	X
	BS-I15	JC83998-2	Soil	3/7/2019		X	X	X
	BS-H16	JC83998-3	Soil	3/7/2019		X	X	X
JC84093	FB(20190308)	JC84093-1	Water	3/8/2019		X	X	X
	BS-C17A	JC84093-2	Soil	3/8/2019		X	X	X
	BS-I16	JC84093-3	Soil	3/8/2019		X	X	X
	BS-E17	JC84093-4	Soil	3/8/2019		X	X	X
JC84109	FB(20190308)-A	JC84109-1	Water	3/8/2019			X	
	SW-A21(0.0-0.5)	JC84109-2	Soil	3/8/2019		X	X	X
	SW-A21(2.0-2.5)	JC84109-3	Soil	3/8/2019		X	X	X
	SW-A20(0.0-0.5)	JC84109-4	Soil	3/8/2019		X	X	X
	SW-A20(2.0-2.5)	JC84109-5	Soil	3/8/2019		X	X	X
	SW-A19(0.0-0.5)	JC84109-6	Soil	3/8/2019		X	X	X
	SW-A19(2.0-2.5)	JC84109-7	Soil	3/8/2019		X	X	X
	SW-A19(4.0-4.5)	JC84109-8	Soil	3/8/2019		X	X	X
	SW-A18(0.0-0.5)	JC84109-9	Soil	3/8/2019		X	X	X
	SW-A18(2.0-2.5)	JC84109-10	Soil	3/8/2019		X	X	X
	SW-A18(4.0-4.5)	JC84109-11	Soil	3/8/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC83998 and JC84093: Miscellaneous parameters for sample BS-H16 and BS-E17 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X	X ¹		
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

¹ SDG #JC84109: An unpreserved sample container was not received for sample FB(20190308)-A. The hexavalent chromium, redox, and pH analyses for sample FB(20190308)-A were cancelled.

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC84109: The MS analysis performed on sample location SW-A18(0.0-0.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC83998, JC84093, and JC84109: The MS analysis performed on sample locations BS-H16, BS-E17, and SW-A18(0.0-0.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H16	Hexavalent Chromium, Insoluble	69.1%	68.2%
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-E17	Hexavalent Chromium, Insoluble	64.7%	64.9%
	Hexavalent Chromium, Soluble	< 50%	< 50%
SW-A18(0.0-0.5)	Hexavalent Chromium, Soluble	55.2%	AC (79.4%)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC83998 and JC84093: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC84109: The reanalysis of the field samples are usable; no qualification of the results was required.

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC84109: The PDS analysis performed on sample location SW-A18(0.0-0.5) exhibited recoveries within the control limits.

SDGs #JC83998 and JC84093: The PDS analysis performed on sample locations BS-H16 and BS-E17 exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-H16	Hexavalent Chromium	< 85%	< 85%
BS-E17	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC83998, JC84093: The laboratory duplicate analysis performed on sample locations BS-H16, BS-E17 exhibited results within the control limit.

SDG #JC84109: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

DATA REVIEW REPORT

Sample Location	Analytes	Laboratory Duplicate RPD	Reanalysis Laboratory Duplicate RPD
SW-A18(0.0-0.5)	Hexavalent Chromium	54.5%	53.3%

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-C17A BS-I16 BS-E17 SW-A21(0.0-0.5) SW-A21(2.0-2.5) SW-A20(0.0-0.5) SW-A20(2.0-2.5) SW-A19(0.0-0.5) SW-A19(2.0-2.5) SW-A19(4.0-4.5) SW-A18(0.0-0.5) SW-A18(2.0-2.5) SW-A18(4.0-4.5)	SW846 9045D	Analysis: 5 days	< 24 hours of receipt by laboratory
BS-I15 BS-H16		Analysis: 6 days	
BS-E17 BS-H16	ASTM D3872-86	Analysis: 21 days	< 24 hours from collection
		Analysis: 22 days	

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
BS-E17	SM4500S2-A	Analysis: 21 days	< 7 days from collection
BS-H16		Analysis: 22 days	
BS-E17	Lloyd Kahn	Analysis: 21 days	< 14 days from collection
BS-H16		Analysis: 22 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or

DATA REVIEW REPORT

duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC83998 and JC84093: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC84109: The laboratory duplicate analysis performed on sample location SW-A18(0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 15, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking # _____
SGS Quote # _____
Buyer Order Control # AN-011719-170
SGS Job # JC83998

Client / Project Information		Project Name: <u>PPG Jersey City Site 107</u>												Matrix Codes																			
Company Name: <u>Arcadis</u>		Street: <u>18 Chapel Ave</u>		Billing Information (if different from Report to)																													
Street Address: <u>10 Friends Lane</u>		City: <u>Jersey City, NJ</u>		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____													
City: <u>Newtown PA</u>		Zip: <u>18440</u>		Project #: <u>NP000770.0003</u>		Street Address: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____											
Project Contact: <u>Math Bell</u>		E-mail: _____		Client Purchase Order #: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____											
Phone #: <u>646.752.5629</u>		Fax #: _____		Project Manager: <u>Jim McLaughlin</u>		Attention: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____											
Sampler(s) Name(s): <u>C.C. Hill, D. H. Linky</u>		Phone #: _____		Project Manager: <u>Jim McLaughlin</u>		Attention: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____		City: _____		State: _____											
Lab Sample #		Field ID / Point of Collection		MECH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles								LAB USE ONLY									
																NCI		NCH		HNO3		H2SO4		NONE		DI Water		MEDI		ENCORE			
1		FB(20190307)				3/7/19		1400		DH		FB		2																			
2		BS - I15				3/7/19		1015		CC		SO		1																		A17	
3		BS - H16				3/7/19		1400		CC		SO		1																		M9	
																																C3	

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions									
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <u>Egen</u> <input type="checkbox"/> Other _____									
		INITIAL ASSESSMENT <u>ALZA</u>										LABEL VERIFICATION _____									

Emergency & Rush TIA data available via LabLink																Sample Custody must be documented below each time samples change possession, including courier delivery.															
Relinquished by Sampler: <u>CPell</u>		Date Time: <u>3/7/19 1930</u>		Received By: <u>Robert Chausse</u>		Date Time: _____		Relinquished By: <u>Robert Chausse</u>		Date Time: <u>3/7/19 1600</u>		Received By: <u>A</u>		Date Time: _____		Received By: _____		Date Time: _____		Received By: _____		Date Time: _____		Received By: _____		Date Time: _____		Received By: _____			
3				3				4				4				4				4				4				4			
5				5				Custody Seal # <u>03153</u>		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable <input type="checkbox"/>		On Ice <input checked="" type="checkbox"/>		Cooler Temp. <u>3.2°C</u>															

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.

5.2
5

Report of Analysis

Client Sample ID: FB(20190307)	Date Sampled: 03/07/19
Lab Sample ID: JC83998-1	Date Received: 03/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/07/19 22:06	JO	SW846 7196A
Redox Potential Vs H2	469		mv	1	03/12/19 20:48	EB	ASTM D1498-76
pH ^a	5.68		su	1	03/07/19 17:03	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I15	Date Sampled: 03/07/19
Lab Sample ID: JC83998-2	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54 UJ-	0.54	mg/kg	1	03/15/19 23:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	165		mv	1	03/13/19 19:49	EB	ASTM D1498-76M
Solids, Percent	74.4		%	1	03/08/19 09:21	RC	SM2540 G 18TH ED MOD
pH	6.86 J		su	1	03/13/19 19:52	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H16	Date Sampled: 03/07/19
Lab Sample ID: JC83998-3	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 71.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	03/15/19 22:52	JOO	SW846 3060A/7196A
Redox Potential Vs H2	225		mv	1	03/13/19 19:54	EB	ASTM D1498-76M
Solids, Percent	71		%	1	03/08/19 09:21	RC	SM2540 G 18TH ED MOD
pH	6.73 J		su	1	03/13/19 19:54	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I15	Date Sampled: 03/07/19
Lab Sample ID: JC83998-2R	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54	0.54	mg/kg	1	03/22/19 17:42	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H16	Date Sampled: 03/07/19
Lab Sample ID: JC83998-3R	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 71.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	03/22/19 17:39	RI	SW846-3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H16	Date Sampled: 03/07/19
Lab Sample ID: JC83998-3RT	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 71.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.48 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 ^R
Total Organic Carbon ^c	22800 J	140	mg/kg	1	03/29/19 18:01	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190307)		Date Sampled: 03/07/19
Lab Sample ID: JC83998-1A		Date Received: 03/07/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46274

(2) Prep QC Batch: MP12932

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190307)	Date Sampled: 03/07/19
Lab Sample ID: JC83998-1A	Date Received: 03/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/08/19 17:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I15	Date Sampled: 03/07/19
Lab Sample ID: JC83998-2A	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.1	1.3	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.5	5.3	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.9	6.7	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46274

(2) Prep QC Batch: MP12917

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I15		Date Sampled: 03/07/19
Lab Sample ID: JC83998-2A		Date Received: 03/07/19
Matrix: SO - Soil		Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.1	1.8	mg/kg	1	03/15/19 23:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H16		Date Sampled: 03/07/19
Lab Sample ID: JC83998-3A		Date Received: 03/07/19
Matrix: SO - Soil		Percent Solids: 71.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.6	1.4	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.9	5.4	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.0	6.8	mg/kg	1	03/07/19	03/08/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46274

(2) Prep QC Batch: MP12917

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H16	Date Sampled: 03/07/19
Lab Sample ID: JC83998-3A	Date Received: 03/07/19
Matrix: SO - Soil	Percent Solids: 71.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.6	2.0	mg/kg	1	03/15/19 22:52	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SP
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2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/enhsusa

E

FED-EX Tracking #
SGS Quote #
Business Control #
SGS Job #
AB-011719-174
SC 84093

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Arcadis		Project Name: PPH Jersey City SL 107										Total Chromium Trivalent Chromium Hexavalent Chromium Ammonium Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chiquel Ave																	
City: Jersey City NJ 07310		City: Jersey City NJ																	
Project Contact: Math Bell		Project #: N8000770.0003																	
Phone #: 646.352.5629		Client Purchase Order #:																	
Sampler(s) Name(s): Christina Celli		Project Manager: Jim McLaughlin																	
SGS Sample #	Field ID / Point of Collection	MEQ/MDI Vol #	Date	Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	PC	MSOP	INCL	IN-SD	IN-SE	IN-NOE	IN-MSM	IN-MSA	IN-MSD	LAB USE ONLY	
1	FB (20190308)		3/8/19	0845	CC	G	FB	2											
2	BS-C17A		3/8/19	1100	CC	G	SO	1										A19	
3	BS-I16		3/8/19	1130	CC	G	SO	1										M18	
4	BS-E17		3/8/19	1200	CC	G	SO	1										C43	
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions							
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format Fast							
* Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions							
Sample Custody must be documented below each time samples change possession, including courier delivery.																			
Relinquished by: CC Celli	Date / Time: 3/8/19 1410	Received by: Robert Chambers	Relinquished by: Robert Chambers	Date / Time: 3/8/19 1701	Received by: [Signature]														
Relinquished by:	Date / Time:	Received by:	Relinquished by:	Date / Time:	Received by:														
Relinquished by:	Date / Time:	Received by:	Relinquished by:	Date / Time:	Received by:														
Custody Seal # 25086 <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact Preserved where applicable <input type="checkbox"/> Absent Therm. ID: On Ice <input checked="" type="checkbox"/> Cooler Temp. °C 3.3																			

5.2
5

INITIAL ASSESSMENT **RLZB**
LABEL VERIFICATION _____



Report of Analysis

Client Sample ID: FB(20190308)	Date Sampled: 03/08/19
Lab Sample ID: JC84093-1	Date Received: 03/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/08/19 20:20	JOO	SW846 7196A
Redox Potential Vs H2	467		mv	1	03/12/19 21:08	EB	ASTM D1498-76
pH ^a	5.66		su	1	03/08/19 18:00	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C17A	Date Sampled: 03/08/19
Lab Sample ID: JC84093-2	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 69.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.57 UJ-	0.57	mg/kg	1	03/14/19 17:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	03/13/19 20:10	EB	ASTM D1498-76M
Solids, Percent	69.9		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	6.39 J		su	1	03/13/19 20:03	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I16	Date Sampled: 03/08/19
Lab Sample ID: JC84093-3	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	03/14/19 17:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	168		mv	1	03/13/19 20:17	EB	ASTM D1498-76M
Solids, Percent	72.8		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	6.78 J		su	1	03/13/19 20:05	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/08/19
Lab Sample ID: JC84093-4	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59 UJ-	0.59	mg/kg	1	03/14/19 17:27	RI	SW846 3060A/7196A
Redox Potential Vs H2	202		mv	1	03/13/19 20:20	EB	ASTM D1498-76M
Solids, Percent	67.5		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	6.87 J		su	1	03/13/19 20:10	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-C17A	Date Sampled: 03/08/19
Lab Sample ID: JC84093-2R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 69.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.57	0.57	mg/kg	1	03/22/19 14:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I16	Date Sampled: 03/08/19
Lab Sample ID: JC84093-3R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	03/22/19 14:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/08/19
Lab Sample ID: JC84093-4R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	03/22/19 14:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/08/19
Lab Sample ID: JC84093-4RT	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.80 J	0.20	%	1	03/29/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	03/29/19 11:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	45600 J	150	mg/kg	1	03/29/19 18:27	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190308)		Date Sampled: 03/08/19
Lab Sample ID: JC84093-1A		Date Received: 03/08/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46281

(2) Prep QC Batch: MP12984

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190308)	Date Sampled: 03/08/19
Lab Sample ID: JC84093-1A	Date Received: 03/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/11/19 18:51	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-C17A		Date Sampled: 03/08/19
Lab Sample ID: JC84093-2A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 69.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	03/11/19	03/11/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	15.8	1.5	mg/kg	1	03/11/19	03/11/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	5.8	mg/kg	1	03/11/19	03/11/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	03/11/19	03/11/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.5	7.3	mg/kg	1	03/11/19	03/11/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-C17A		Date Sampled: 03/08/19
Lab Sample ID: JC84093-2A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 69.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.8	2.1	mg/kg	1	03/14/19 17:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I16		Date Sampled: 03/08/19
Lab Sample ID: JC84093-3A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	13.2	1.4	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	5.6	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.7	7.0	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I16	Date Sampled: 03/08/19
Lab Sample ID: JC84093-3A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	2.0	mg/kg	1	03/14/19 17:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E17		Date Sampled: 03/08/19
Lab Sample ID: JC84093-4A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	15.4	1.5	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	5.9	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.3	7.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E17	Date Sampled: 03/08/19
Lab Sample ID: JC84093-4A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4	2.1	mg/kg	1	03/14/19 17:27	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



50
FB

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TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Sample Order Control #
SGS Quote #	AV-121018-219
	SGS Job #
	JC84109

Company Name Arccadis		Project Name PPG Jersey City Site 107		Matrix Codes												
Street Address 10 Friends Lane		Street 10 Chapel Ave.		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank												
City Newtown PA 18440		City Jersey City, NJ		Billing Information (If different from Report to) Company Name Street Address City State Zip												
Project Contact Matt Bell		Project # NE000770.3		Attention: Project Manager Jim McLaughlin												
Phone # 646.752.5629		Client Purchase Order #		Number of preserved bottles MCI, MeSH, HNO3, H2SO4, NONE, DI Water, MESH, ENCORE												
Sample(s) Name(s) Christina Feld		Phone #		Matrix Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium												
Lab Sample #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	MCI	MeSH	HNO3	H2SO4	NONE	DI Water	MESH	ENCORE	LAB USE ONLY
1	FB(20190308) - A		3/8/19	0830		FB	2									A19
2	SW-A21(0.0-0.5)		3/8/19	0920		SO	1									M18
3	SW-A21(2.0-2.5)		3/8/19	0930		SO	1									
4	SW-A20(0.0-0.5)		3/8/19	0945		SO	1									C43
5	SW-A20(2.0-2.5)		3/8/19	0955		SO	1									
6	SW-A19(0.0-0.5)		3/8/19	1005		SO	1									
7	SW-A19(2.0-2.5)		3/8/19	1015		SO	1									
8	SW-A19(4.0-4.5)		3/8/19	1025		SO	1									
9	SW-A18(0.0-0.5)		3/8/19	1030		SO	1									
10	SW-A18(2.0-2.5)		3/8/19	1035		SO	1									
11	SW-A18(4.0-4.5)		3/8/19	1040		SO	1									

Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information				Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDVU <input type="checkbox"/> Other				INITIAL ASSESSMENT LR3A LABEL VERIFICATION			
Emergency & Rush TIA data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory					

Relinquished by Sampler: 1 [Signature]	Date/Time: 3/8/19 1410	Received By: 1 [Signature]	Date/Time: 3/8/19 1700	Relinquished By: 2 [Signature]	Date/Time: 3/8/19 1700	Received By: 2 [Signature]		
Relinquished by Sampler: 3	Date/Time:	Received By: 3	Date/Time:	Relinquished By: 4	Date/Time:	Received By: 4		
Relinquished by: 5	Date/Time:	Received By: 5	Date/Time:	Custody Seal # 25082	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp 3.3°C



Report of Analysis

Client Sample ID: SW-A21(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-2	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 52.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	31.0	0.77	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	260		mv	1	03/13/19 20:28	EB	ASTM D1498-76M
Solids, Percent	52.1		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.86 J		su	1	03/13/19 20:12	EB	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A21(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-3	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 63.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	36.4	0.63	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	305		mv	1	03/13/19 20:29	EB	ASTM D1498-76M
Solids, Percent	63.5		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	8.15 J		su	1	03/13/19 20:17	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A20(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-4	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 59.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	58.5	0.67	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	301		mv	1	03/13/19 21:20	EB	ASTM D1498-76M
Solids, Percent	59.9		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	8.20 J		su	1	03/13/19 20:20	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A20(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-5	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	23.2	0.62	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	257		mv	1	03/13/19 21:26	EB	ASTM D1498-76M
Solids, Percent	64.4		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	9.17 J		su	1	03/13/19 19:20	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A19(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-6	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.2	0.49	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	465		mv	1	03/13/19 22:25	EB	ASTM D1498-76M
Solids, Percent	82.4		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.78 J		su	1	03/13/19 21:35	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A19(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-7	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	70.3	2.4	mg/kg	5	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	506		mv	1	03/13/19 22:31	EB	ASTM D1498-76M
Solids, Percent	81.7		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.79 J		su	1	03/13/19 21:40	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A19(4.0-4.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-8	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9	0.49	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	368		mv	1	03/13/19 22:42	EB	ASTM D1498-76M
Solids, Percent	81.1		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.05 J		su	1	03/13/19 21:45	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A18(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-9	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.2	0.49	mg/kg	1	03/15/19 13:00	RI	SW846 3060A/7196A
Redox Potential Vs H2	491		mv	1	03/13/19 22:19	EB	ASTM D1498-76M
Solids, Percent	81.6		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.35 J		su	1	03/13/19 21:20	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A18(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-10	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 79.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	15.3	0.51	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	373		mv	1	03/13/19 22:44	EB	ASTM D1498-76M
Solids, Percent	79.2		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.81 J		su	1	03/13/19 21:51	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(4.0-4.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-11	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.6	0.48	mg/kg	1	03/15/19 13:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	382		mv	1	03/13/19 22:48	EB	ASTM D1498-76M
Solids, Percent	82.9		%	1	03/10/19 14:00	BG	SM2540 G 18TH ED MOD
pH	7.88 J		su	1	03/13/19 21:54	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A21(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-2R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 52.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	39.1 J	0.77	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A21(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-3R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 63.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	34.0 J	0.63	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A20(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-4R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 59.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	52.3 J	0.67	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A20(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-5R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	138 J	3.1	mg/kg	5	04/01/19 16:19	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A19(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-6R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	24.6 J	0.49	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A19(2.0-2.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-7R		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	102 J	2.4	mg/kg	5	04/01/19 16:19	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A19(4.0-4.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-8R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.9 J	0.49	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A18(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-9R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	11.0 J	0.49	mg/kg	1	04/01/19 16:07	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-10R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 79.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	25.9 J	0.51	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(4.0-4.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-11R	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.8 J	0.48	mg/kg	1	04/01/19 16:17	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190308)-A	Date Sampled: 03/08/19
Lab Sample ID: JC84109-1A	Date Received: 03/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/11/19	03/11/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46281

(2) Prep QC Batch: MP12984

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A21(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-2A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 52.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 12	12	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	2400	5.9	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	454	7.9	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 5.9	5.9	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	802	30	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A21(0.0-0.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-2A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 52.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	2370 2360	6.7	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A21(2.0-2.5) Lab Sample ID: JC84109-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 63.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 6.1	6.1	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	1020	3.1	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	170	6.1	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.1	3.1	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	283	7.6	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A21(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-3A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 63.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	984 986	3.7	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A20(0.0-0.5) Lab Sample ID: JC84109-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 59.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 9.8	9.8	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	1730	4.9	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	404	6.5	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 4.9	4.9	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	778	25	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A20(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-4A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 59.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1670 1680	5.6	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A20(2.0-2.5) Lab Sample ID: JC84109-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 64.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 15	15	mg/kg	5	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	3540	7.7	mg/kg	5	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	513	6.1	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 7.7	7.7	mg/kg	5	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	884	38	mg/kg	5	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A20(2.0-2.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-5A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 64.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	3520 3400	8.3	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A19(0.0-0.5) Lab Sample ID: JC84109-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 82.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.9	4.9	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	815	2.4	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	90.6	4.9	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	150	6.1	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A19(0.0-0.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-6A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	801 790	2.9	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A19(2.0-2.5) Lab Sample ID: JC84109-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 81.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 7.2	7.2	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	1740	3.6	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	139	4.8	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.6	3.6	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	231	18	mg/kg	3	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A19(2.0-2.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-7A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1670 1640	6.0	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A19(4.0-4.5) Lab Sample ID: JC84109-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 81.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	53.7	1.2	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	13.6	4.8	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.6	6.0	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A19(4.0-4.5)		Date Sampled: 03/08/19
Lab Sample ID: JC84109-8A		Date Received: 03/08/19
Matrix: SO - Soil		Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	50.8 49.8	1.7	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A18(0.0-0.5) Lab Sample ID: JC84109-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 81.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	296	1.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	36.8	5.1	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	58.9	6.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(0.0-0.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-9A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	289 285	1.8	mg/kg	1	03/15/19 13:00	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(2.0-2.5) Lab Sample ID: JC84109-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 79.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	299	1.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ³
Nickel	31.8	5.2	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.6	2.6	mg/kg	2	03/11/19	03/12/19 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	34.3	6.4	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46280
- (2) Instrument QC Batch: MA46287
- (3) Prep QC Batch: MP12949

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(2.0-2.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-10A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 79.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	284 273	1.8	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(4.0-4.5) Lab Sample ID: JC84109-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/08/19 Date Received: 03/08/19 Percent Solids: 82.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	103	1.2	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	16.1	4.6	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.3	5.8	mg/kg	1	03/11/19	03/11/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46280

(2) Prep QC Batch: MP12949

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A18(4.0-4.5)	Date Sampled: 03/08/19
Lab Sample ID: JC84109-11A	Date Received: 03/08/19
Matrix: SO - Soil	Percent Solids: 82.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	92.4 96.2	1.7	mg/kg	1	03/15/19 13:08	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC84193, JC84194, and JC84245

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33443R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC84193, JC84194, and JC84245 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC84193	FB(20190311)	JC84193-1	Water	3/11/2019		X	X	X
	BS-D17A	JC84193-2	Soil	3/11/2019		X	X	X
JC84194	FB(20190311)-A	JC84194-1	Water	3/11/2019		X	X	X
	BS-B1	JC84194-2	Soil	3/11/2019		X	X	X
JC84245	FB(20190312)-A	JC84245-1	Water	3/12/2019		X	X	X
	SW-A30(0.0-0.5)	JC84245-2	Soil	3/12/2019		X	X	X
	SW-A30(2.0-2.5)	JC84245-3	Soil	3/12/2019		X	X	X
	SW-A30(4.0-4.5)	JC84245-4	Soil	3/12/2019		X	X	X
	SW-A30(6.0-6.5)	JC84245-5	Soil	3/12/2019		X	X	X
	SW-A30(8.0-8.5)	JC84245-6	Soil	3/12/2019		X	X	X
	SW-A31(0.0-0.5)	JC84245-7	Soil	3/12/2019		X	X	X
	SW-A31(2.0-2.5)	JC84245-8	Soil	3/12/2019		X	X	X
	SW-A32(0.0-0.5)	JC84245-9	Soil	3/12/2019		X	X	X
	SW-A32(2.0-2.5)	JC84245-10	Soil	3/12/2019		X	X	X
	SW-A33(0.0-0.5)	JC84245-11	Soil	3/12/2019		X	X	X
	108_CONC-B1	JC84245-14	Soil	3/12/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDG #JC84193: Miscellaneous parameters for sample BS-D17A also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC84194 and JC84245: The MS analysis performed on sample locations BS-B1 and SW-A30(0.0-0.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC84193: The MS analysis performed on sample location BS-D17A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-D17A	Hexavalent Chromium, Insoluble	59.3%	< 50%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC84193: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC84194 and JC84245: The PDS analysis performed on sample locations BS-B1 and SW-A30(0.0-0.5) exhibited recoveries within the control limits.

SDG #JC84193: The PDS analysis performed on sample location BS-D17A exhibited a recovery outside of the control limits as presented in the table below.

DATA REVIEW REPORT

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-D17A	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC84193: The laboratory duplicate analysis performed on sample location BS-D17A exhibited results within the control limit.

SDGs #JC84194 and JC84245: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
BS-B1	Hexavalent Chromium	104%
SW-A30(0.0-0.5)	Hexavalent Chromium	55.8%

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190311)-A	SM4500H+B	Analysis: 28 hours	< 24 hours of receipt by laboratory
BS-D17A BS-B1	SW846 9045D	Analysis: 6 days	< 24 hours of receipt by laboratory
SW-A30(0.0-0.5) SW-A30(2.0-2.5) SW-A30(4.0-4.5) SW-A30(6.0-6.5) SW-A30(8.0-8.5) SW-A31(0.0-0.5)		Analysis: 7 days	
SW-A31(2.0-2.5) SW-A32(0.0-0.5) SW-A32(2.0-2.5) SW-A33(0.0-0.5) 108_CONC-B1		Analysis: 8 days	
BS-D17A		ASTM D3872-86	
BS-D17A	SM4500S2-A	Analysis: 35 days	< 7 days from collection
BS-D17A	Lloyd Kahn	Analysis: 29 days	< 14 days from collection

DATA REVIEW REPORT

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC84193 and JC84194: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC84245: The laboratory duplicate analysis performed on sample location SW-A32(0.0-0.5) exhibited results within the control limit.

DATA REVIEW REPORT

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 15, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499(3480)
www.sgs.com/ehsus

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **AK-121018-206**
SGS Job # **JC84193**

Client / Reporting Information		Project Information				Requested Analysis										Matrix Codes						
Company Name: Arcadis		Project Name: PPG SITE 107 (Jersey City)				Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rise Blank TB - Trip Blank						
Street Address: 10 FRIENDS LANE, SUITE 100		Street: 18 CHAPEL AVENUE																				
City: NEWTON PA 18940		City: JERSEY CITY NJ																				
Project Contact: Matthew Bell		Company Name: NP000770.003																				
Phone #: 610-755-7080		Project #																				
Sampler(s) Name(s): C. Cefelli		Project Manager: Jim McLaughlin Jr																				
SGS Sense #	Field ID / Point of Collection	MEQ/VI Viol #	Date	Time	Sampled by	One (O) (One-C)	Matrix	# of bottles	HC	NaOH	HNO3	H2SO4	None	ED	Other	ENGINE	LAB USE ONLY					
1	FB(20190311)		3/11/19	1201	CC	G	FB	2									A19					
2	BS-D17A		3/11/19	1230	CC	G	SO	1									G48					
																	CS					
Turn Around Time (Business Days)																						
<input type="checkbox"/> 16 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other										Approved By (SGS PM) / Date: _____ Approval needed for 1-3 Business Day TAT				Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP			<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input type="checkbox"/> EDD Format			<input type="checkbox"/> DOD-QSMS INITIAL ASSESSMENT 3A LABEL VERIFICATION _____		
Sample Custody must be documented below each time samples change possession, including courier delivery.																						
Relinquished by: C. Cefelli		Date / Time: 3/11/19 1417		Received By: T. Schwan		Date / Time: 3/11/19 1330		Relinquished By: T. Schwan		Date / Time: 3/11/19		Received By: A		Date / Time: 3/11/19								
Relinquished by: _____		Date / Time: _____		Received By: _____		Date / Time: _____		Relinquished By: _____		Date / Time: _____		Received By: _____		Date / Time: _____								
Relinquished by: _____		Date / Time: _____		Received By: _____		Date / Time: _____		Custody Seal # 17140		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent		<input checked="" type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp. °C								

5.2
5

CTP
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Report of Analysis

Client Sample ID: FB(20190311)	Date Sampled: 03/11/19
Lab Sample ID: JC84193-1	Date Received: 03/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/11/19 21:33	MO	SW846 7196A
Redox Potential Vs H2	455		mv	1	03/12/19 21:32	EB	ASTM D1498-76
pH ^a	5.20		su	1	03/11/19 17:30	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D17A	Date Sampled: 03/11/19
Lab Sample ID: JC84193-2	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 75.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	03/20/19 17:17	RI	SW846 3060A/7196A
Redox Potential Vs H2	258		mv	1	03/17/19 10:46	JOO	ASTM D1498-76M
Solids, Percent	75.8		%	1	03/12/19 14:45	BG	SM2540 G 18TH ED MOD
pH	7.10 J		su	1	03/17/19 10:46	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D17A	Date Sampled: 03/11/19
Lab Sample ID: JC84193-2R	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 75.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	04/03/19 20:08	JOO	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D17A	Date Sampled: 03/11/19
Lab Sample ID: JC84193-2RT	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 75.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	04/15/19 08:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	04/15/19	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	17200 J	130	mg/kg	1	04/09/19 20:52	JO	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190311)		Date Sampled: 03/11/19
Lab Sample ID: JC84193-1A		Date Received: 03/11/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46288

(2) Prep QC Batch: MP13055

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190311)	Date Sampled: 03/11/19
Lab Sample ID: JC84193-1A	Date Received: 03/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/12/19 16:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D17A	Date Sampled: 03/11/19
Lab Sample ID: JC84193-2A	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 75.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Chromium	80.5	1.3	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Nickel	22.5	5.2	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Vanadium	57.2	6.5	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46290

(2) Prep QC Batch: MP13027

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D17A	Date Sampled: 03/11/19
Lab Sample ID: JC84193-2A	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 75.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	80.0	1.8	mg/kg	1	03/20/19 17:17	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



50
PB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E/L

FED EX Tracking #
SGS Quote #
Bottle Order Control # **AK-03519-108**
SGS Job # **JC84194**

Client / Reporting Information		Project Information				Requested Analysis										Matrix Codes		
Company Name: Arcaadis		Project Name: PPG Site 107 (Jersey City)				Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Waste SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address: 10 Friends Lane, Suite 100		Street: 10 Chapel Avenue																
City: Newtown, PA 18940		City: Jersey City NJ																
Phone #: 610-255-2080		Client Purchase Order #: NP000270.0003																
Sample(s) Name(s): C. C. Falli		Project Manager: Jim McLaughlin, Jr.																
Sample #	Field ID / Point of Collection	MECH/VDI Vial #	Date	Time	Sampled by	Grav (G)	Grav (G)	Matrix	# of bottles	HCl	NH3	NO3	NO2	None	Dr. Water	MECH	ENCLOSURE	LAB USE ONLY
1	FB(20190311)-A		3/11/19	1145	CC	G	FB	2										
2	BS-B1		3/11/19	1345	CC	G	SO	1										A19 G48 C5

5.2
5

Turn Around Time (Business Days)

Approved By (SGS PM) / Date:

Deliverable

Comments / Special Instructions

10 Business Days
 5 Business Days
 3 Business Days
 2 Business Days
 1 Business Day
 Other

Commercial "A" (Level 1)
 Commercial "B" (Level 2)
 NJ Reduced (Level 3)
 Full Tier I (Level 4)
 Commercial "C"
 NJ DKQP

NYASP Category A
 NYASP Category B
 MA MCP Criteria
 CT RCP Criteria
 State Forms
 EDD Format

DOD-QSMS
 * Please pulverize sample if nodules exist.
 INITIAL ASSESSMENT 3A @
 LABEL VERIFICATION
<http://www.sgs.com/en/terms-and-conditions>

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: CC Falli	Date / Time: 3/11/19 1145	Received By: TSC HAW	Date / Time: 3/11/19 0330	Relinquished By: TSC HAW	Date / Time: 3/11/19 1721	Received By: [Signature]
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished By:	Date / Time:	Received By:
Relinquished by:	Date / Time:	Received By:	Date / Time:	Custody Seal # 17160	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Therm. ID.

CIP
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EHS-A-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190311)-A	Date Sampled: 03/11/19
Lab Sample ID: JC84194-1	Date Received: 03/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/11/19 21:33	MO	SW846 7196A
Redox Potential Vs H2	336		mv	1	03/12/19 21:25	EB	ASTM D1498-76
pH ^a	4.25 J		su	1	03/12/19 21:14	EB	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B1	Date Sampled: 03/11/19
Lab Sample ID: JC84194-2	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.7 J	0.46	mg/kg	1	03/20/19 18:15	RI	SW846 3060A/7196A
Redox Potential Vs H2	266		mv	1	03/17/19 10:49	JOO	ASTM D1498-76M
Solids, Percent	86.3		%	1	03/12/19 14:45	BG	SM2540 G 18TH ED MOD
pH	7.76 J		su	1	03/17/19 08:57	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190311)-A	Date Sampled: 03/11/19
Lab Sample ID: JC84194-1A	Date Received: 03/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/12/19	03/12/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46288

(2) Prep QC Batch: MP13055

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190311)-A	Date Sampled: 03/11/19
Lab Sample ID: JC84194-1A	Date Received: 03/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/12/19 16:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-B1		Date Sampled: 03/11/19
Lab Sample ID: JC84194-2A		Date Received: 03/11/19
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Chromium	10.1	1.1	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Nickel	8.5	4.5	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²
Vanadium	12.3	5.7	mg/kg	1	03/12/19	03/12/19	MET SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46290

(2) Prep QC Batch: MP13027

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B1	Date Sampled: 03/11/19
Lab Sample ID: JC84194-2A	Date Received: 03/11/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.4	1.6	mg/kg	1	03/20/19 18:15	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO. SOL
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking # [Blank]
SGS Quote # 84245
Bill of Materials # 177
SGS Job # 177

Client / Reporting Information				Project Information											Requested Analysis										Matrix Codes
Company Name: Ancealis		Project Name: PPG SITE 107 (Jersey City)		Street Address: 10 FRIENDS LANE, SUITE 100 NEWTOWN, PA 18940							Billing Information (if different from Report to): Company Name: Jersey City NJ Project #: NP000770.0003 Street Address: City: State: Zip:				<div style="display: flex; flex-direction: column; align-items: center; text-align: center;"> Hexavalent Chromium Trivalent Chromium Total Chromium Antimony Nickel Thallium Vanadium </div>										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SD - Soil SL - Sludge SED - Sediment CL - Oil LLD - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Project Contact: Matthew Bell Phone #: 610-755-7080		Project Manager: Jim McLaughlin, Sr.		City: NEWTOWN		State: PA		Zip: 18940		City: Jersey City		State: NJ		Zip: 07310											Matrix Codes:
SGS Sample #	Field ID / Point of Collection	MEDI/DI Vial #	Date	Time	Sampled by	Grab (G) / Comp. (C)	Matrix	# of bottles	PC	NO3H	NO2	NO3E	NO3L	NO3B	NO3T	NO3C	NO3D	NO3E	NO3F	NO3G	NO3H	NO3I	LAB USE ONLY		
1	FB(20190312) - A		3/12/19	0800	CC	G	FB	2																	
2	SW - A30(0.0 - 0.5)		3/12/19	0945	CC	G	SO	1															CS		
3	SW - A30(2.0 - 2.5)		3/12/19	0950	CC	G	SO	1															A19		
4	SW - A30(4.0 - 4.5)		3/12/19	0955	CC	G	SO	1															B16		
5	SW - A30(6.0 - 6.5)		3/12/19	1000	CC	G	SO	1																	
6	SW - A30(8.0 - 8.5)		3/12/19	1005	CC	G	SO	1																	
7	SW - A31(0.0 - 0.5)		3/12/19	1020	CC	G	SO	1																	
8	SW - A30(2.0 - 2.5)		3/12/19	1025	CC	G	SO	1																	
9	SW - A30(0.0 - 0.5)		3/12/19	1035	CC	G	SO	1																	
10	SW - A32(2.0 - 2.5)		3/12/19	1040	CC	G	SO	1																	
11	SW - A33(0.0 - 0.5)		3/12/19	1045	CC	G	SO	1																	
12	107-M032N		3/12/19	1010	CC	G	SO	1																	

5.2
5

<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other:	Approved By (SGS PM): / Date:	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format: Full	<input type="checkbox"/> DOD-QSMS	Comments / Special Instructions
--	-------------------------------	--	--	-----------------------------------	---------------------------------

Turn Around Time (Business Days)

Approval needed for 1-3 Business Day TAT

Sample Custody must be documented below each time samples change possession, including courier delivery

Relinquished by: [Signature]	Date / Time: 3/12/19 1420	Received by: Robert Chambers	Date / Time: 3/12/19 1645	Received by: [Signature]
Relinquished by:	Date / Time:	Received by:	Date / Time:	Received by:
Relinquished by:	Date / Time:	Received by:	Date / Time:	Received by:

Custody Seal # 11014

Intact / Not Intact: [] / []

Preserved where applicable: [] / Absent: []

Therm ID: [Blank]

Co Ice: [Blank]

Pooler Temp: [Blank] °C

INITIAL ASSESSMENT [Signature]

LABEL VERIFICATION _____

EHSQAQC-0023-02-FORM-Dayton - Standard COC.xlsx





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsususa

FED-EX Tracking #
SGS Quote #
SGS Order Control #
SGS Job #

Form containing company information (Arcadis), project details (PPH Site 107 Jersey City), lab sample data table, and signature/chain of custody section.

5.2
5

Report of Analysis

Client Sample ID: FB(20190312)-A	Date Sampled: 03/12/19
Lab Sample ID: JC84245-1	Date Received: 03/12/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/12/19 20:30	JOO	SW846 7196A
Redox Potential Vs H2	619		mv	1	03/18/19 00:12	EB	ASTM D1498-76
pH ^a	4.60		su	1	03/12/19 17:30	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A30(0.0-0.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-2	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.1 J	0.44	mg/kg	1	03/20/19 18:25	JOO	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	03/19/19 22:33	EB	ASTM D1498-76M
Solids, Percent	91.2		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.54 J		su	1	03/19/19 22:34	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A30(2.0-2.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-3	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	18.5 J	0.47	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	269		mv	1	03/19/19 22:35	EB	ASTM D1498-76M
Solids, Percent	85.8		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	8.30 J		su	1	03/19/19 22:35	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A30(4.0-4.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-4	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ	0.53	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	230		mv	1	03/19/19 22:40	EB	ASTM D1498-76M
Solids, Percent	75.3		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.12 J		su	1	03/19/19 22:40	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A30(6.0-6.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-5	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 80.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ	0.50	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	185		mv	1	03/19/19 22:45	EB	ASTM D1498-76M
Solids, Percent	80.3		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.00 J		su	1	03/19/19 22:45	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A30(8.0-8.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-6	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54 UJ	0.54	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	186		mv	1	03/19/19 22:49	EB	ASTM D1498-76M
Solids, Percent	74.4		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.97 J		su	1	03/19/19 22:49	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A31(0.0-0.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-7	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.3 J	0.51	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	305		mv	1	03/19/19 22:55	EB	ASTM D1498-76M
Solids, Percent	79		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.56 J		su	1	03/19/19 22:55	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A31(2.0-2.5) Lab Sample ID: JC84245-8 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 77.6
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2 J	0.52	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	03/20/19 20:48	MET	ASTM D1498-76M
Solids, Percent	77.6		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.56 J		su	1	03/20/19 20:49	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A32(0.0-0.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-9	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 80.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ	0.50	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	353		mv	1	03/20/19 20:44	MET	ASTM D1498-76M
Solids, Percent	80.3		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.28 J		su	1	03/20/19 20:45	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A32(2.0-2.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-10	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.48	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	356		mv	1	03/20/19 20:53	MET	ASTM D1498-76M
Solids, Percent	82.5		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	7.54 J		su	1	03/20/19 20:54	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A33(0.0-0.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-11	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ	0.51	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	392		mv	1	03/20/19 20:56	MET	ASTM D1498-76M
Solids, Percent	78.2		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	6.24 J		su	1	03/20/19 20:56	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_CONC-B1	Date Sampled: 03/12/19
Lab Sample ID: JC84245-14	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 91.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.3 J	0.44	mg/kg	1	03/20/19 18:29	JOO	SW846 3060A/7196A
Redox Potential Vs H2	126		mv	1	03/20/19 20:57	MET	ASTM D1498-76M
Solids, Percent	91.4		%	1	03/13/19 12:45	BG	SM2540 G 18TH ED MOD
pH	11.19 J		su	1	03/20/19 20:57	EB	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: FB(20190312)-A		Date Sampled: 03/12/19
Lab Sample ID: JC84245-1A		Date Received: 03/12/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13077

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190312)-A	Date Sampled: 03/12/19
Lab Sample ID: JC84245-1A	Date Received: 03/12/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/13/19 14:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A30(0.0-0.5) Lab Sample ID: JC84245-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 91.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	82.5	1.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	23.7	4.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.1	2.1	mg/kg	2	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	39.5	5.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A30(0.0-0.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-2A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	79.4	1.5	mg/kg	1	03/20/19 18:25	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A30(2.0-2.5) Lab Sample ID: JC84245-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 85.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	233	1.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	28.7	4.5	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	54.5	5.6	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A30(2.0-2.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-3A	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 85.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	215	1.6	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A30(4.0-4.5) Lab Sample ID: JC84245-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 75.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.4	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.4	5.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.6	6.5	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A30(4.0-4.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-4A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 75.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.4	1.8	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A30(6.0-6.5) Lab Sample ID: JC84245-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 80.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.9	1.2	mg/kg	1	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	4.9	mg/kg	1	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.1	6.1	mg/kg	1	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A30(6.0-6.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-5A	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 80.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.9	1.7	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A30(8.0-8.5) Lab Sample ID: JC84245-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 74.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.2	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	5.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.5	6.7	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A30(8.0-8.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-6A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 74.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.2	1.8	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A31(0.0-0.5) Lab Sample ID: JC84245-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 79.0
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	51.0	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	29.3	4.8	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	39.3	6.0	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A31(0.0-0.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-7A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	47.7	1.7	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A31(2.0-2.5) Lab Sample ID: JC84245-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 77.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	86.9	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	23.9	5.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.4	6.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A31(2.0-2.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-8A	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	83.7	1.8	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A32(0.0-0.5) Lab Sample ID: JC84245-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 80.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	23.0	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	17.2	4.9	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	45.1	6.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A32(0.0-0.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-9A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 80.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.0	1.7	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A32(2.0-2.5)		Date Sampled: 03/12/19
Lab Sample ID: JC84245-10A		Date Received: 03/12/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	29.2	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	18.2	4.6	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	03/13/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.7	5.8	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A32(2.0-2.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-10A	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.9	1.7	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A33(0.0-0.5) Lab Sample ID: JC84245-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 78.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.3	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	16.0	5.0	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	41.2	6.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A33(0.0-0.5)	Date Sampled: 03/12/19
Lab Sample ID: JC84245-11A	Date Received: 03/12/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.3	1.7	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_CONC-B1 Lab Sample ID: JC84245-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 91.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	81.6	1.1	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	17.5	4.3	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.2	3.2	mg/kg	3	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.3	5.4	mg/kg	1	03/13/19	03/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46296

(2) Prep QC Batch: MP13076

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: 108_CONC-B1 Lab Sample ID: JC84245-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/12/19 Date Received: 03/12/19 Percent Solids: 91.4
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4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	69.3	1.5	mg/kg	1	03/20/19 18:29	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC84311, JC84441, JC84442, JC84506, and JC84519

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33444R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC84311, JC84441, JC84442, JC84506, and JC84519 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC84311	FB(20190313)-A	JC84311-1	Water	3/13/2019		X	X	X
	BS-B0	JC84311-2	Soil	3/13/2019		X	X	X
JC84441	FB(20190314)-A	JC84441-1	Water	3/14/2019		X	X	X
	BS-BO-2	JC84441-2	Soil	3/14/2019		X	X	X
JC84442	FB(20190314)	JC84442-1	Water	3/14/2019		X	X	X
	BS-F18	JC84442-2	Soil	3/14/2019		X	X	X
JC84506	FB(20190315)	JC84506-1	Water	3/15/2019		X	X	X
	BS-F17	JC84506-2	Soil	3/15/2019		X	X	X
JC84519	FB(20190315)-A	JC84519-1	Water	3/15/2019		X	X	X
	SW-A8(2.0-2.5)	JC84519-2	Soil	3/15/2019		X	X	X
	SW-A8(4.0-4.5)	JC84519-3	Soil	3/15/2019		X	X	X
	SW-A8(6.0-6.5)	JC84519-4	Soil	3/15/2019		X	X	X
	108_M018W2	JC84519-5	Soil	3/15/2019		X	X	X
	108_M018W1	JC84519-6	Soil	3/15/2019		X	X	X
	SW-A7(0.0-0.5)	JC84519-7	Soil	3/15/2019		X	X	X
	SW-A7(2.0-2.5)	JC84519-8	Soil	3/15/2019		X	X	X
	SW-A7(4.0-4.5)	JC84519-9	Soil	3/15/2019		X	X	X
	DUP-04(20190315)RR	JC84519-10	Soil	3/15/2019	SW-A8(6.0-6.5)	X	X	X
	108_M018_E	JC84519-11	Soil	3/15/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC84311, JC84441, JC84442, and JC84506: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC84519: The MS/MSD analysis performed on sample location SW-A7(4.0-4.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A7(4.0-4.5)	Antimony	67.6%	62.5%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

DATA REVIEW REPORT

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC84311, JC84441, JC84442, and JC84506: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC84519: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A7(4.0-4.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A8(6.0-6.5) / DUP-04(20190315)RR	Nickel	14.0	11.5	AC
	Vanadium	23.8	23.4	
	Chromium	16.6	15.6	6.2%
	Trivalent Chromium	16.2	15.2	6.4%

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A8(6.0-6.5) and field duplicate sample DUP-04(20190315)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC84311, JC84441, JC84442, and JC84506: The serial dilution analysis was not performed using a sample from these SDGs.

DATA REVIEW REPORT

SDG #JC84519: The serial dilution analysis performed using sample SW-A7(4.0-4.5) exhibited %D within the control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC84311, JC84441, and JC84519: The MS analysis performed on sample locations BS-B0, BS-BO-2, and SW-A7(4.0-4.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG # JC84442 and JC84506: The MS analysis was not performed using a sample from these SDGs.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC84311, JC84441, and JC84519: The PDS analysis performed on sample locations BS-B0, BS-BO-2, and SW-A7(4.0-4.5) exhibited recoveries within the control limits.

SDG # JC84442 and JC84506: The laboratory duplicate analysis was not performed using a sample from these SDGs.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG # JC84442 and JC84506: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC84311, JC84441, and JC84519: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
BS-B0	Hexavalent Chromium	$> \pm$ RL
BS-BO-2	Hexavalent Chromium	38.3%
SW-A7(4.0-4.5)	Hexavalent Chromium	$> \pm$ RL

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A8(6.0-6.5) / DUP-04(20190315)RR	Hexavalent Chromium	0.46 U	0.45 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample SW-A8(6.0-6.5) and field duplicate sample DUP-04(20190315)RR.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-BO-2	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-F18		Analysis: 4 days	
BS-B0		Analysis: 6 days	
BS-F17			
SW-A8(2.0-2.5)			
SW-A8(4.0-4.5)			
SW-A8(6.0-6.5)			
108_M018W2			
108_M018W1			
SW-A7(0.0-0.5)			
SW-A7(2.0-2.5)			
SW-A7(4.0-4.5)			
DUP-04(20190315)RR			
108_M018_E			

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC84311, JC84441, JC84442, and JC84506: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC84519: The laboratory duplicate analysis performed on sample location SW-A7(4.0-4.5) exhibited results within the control limit.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A8(6.0-6.5) / DUP-04(20190315)RR	Redox	373	409	9.2%
	pH	7.17	7.25	1.1%

The differences in the results between the parent sample SW-A8(6.0-6.5) and field duplicate sample DUP-04(20190315)RR were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 15, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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PB

CHAIN OF CUSTODY

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TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E

FED/EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC84311

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes					
Company Name: Arcadis		Project Name: PPH Jersey City Site 107		Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Vanadium Thallium Nickel										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank					
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																	
City: Newtown PA 18440		City: Jersey City NJ																	
Project Contact: Krista Mastrocchia		Project #: N600770.0003																	
Phone #: 610.755.7080		Client Purchase Order #:																	
Sampler(s) Name(s): Christina Cifelli		Phone #: 201.201.2665		Project Manager: Sara McLaughlin		Attention:													
SGS Sample #	Field ID / Point of Collection	MED/VII Viol #	Date	Time	Sampled by	Core ID / Comp (C)	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ O ₂	H ₂ SO ₄	H ₂ CO ₃	ED Water	MHA	MCHA	ENCLOSURE	LAB USE ONLY
1	FB(20190713) - A		3/13/19	0810	CC	G	FB	2											A10
2	BS - B0		3/12/19	1045	CC	A	SO	1											G34
																			D6

Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP	
<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Format (EQU)		<input type="checkbox"/> DOD-QSMS		INITIAL ASSESSMENT 3B [Ⓟ] LABEL VERIFICATION _____	

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: C. Cifelli	Date / Time: 3/13/19 1445	Received By: J. Schmitt	Date / Time: 3/13/19 2307	Relinquished by: J. Schmitt	Date / Time: 3/13/19 1641	Received By: A
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:
Relinquished by:	Date / Time:	Received By:	Date / Time:	Custody Seal # 18938	Intact <input type="checkbox"/> Not intact <input type="checkbox"/>	Preserved where applicable <input type="checkbox"/> Absent <input type="checkbox"/>

CIP

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EHS-A-QAC-0023-02-FORM-Dayton - Standard COC.docx



5.2
5

Report of Analysis

Client Sample ID: FB(20190313)-A	Date Sampled: 03/13/19
Lab Sample ID: JC84311-1	Date Received: 03/13/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/13/19 18:20	JOO	SW846 7196A
Redox Potential Vs H2	483		mv	1	03/18/19 12:22	RI	ASTM D1498-76
pH ^a	5.03		su	1	03/13/19 17:00	DDH	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B0	Date Sampled: 03/13/19
Lab Sample ID: JC84311-2	Date Received: 03/13/19
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J	0.46	mg/kg	1	03/27/19 16:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	03/17/19 15:59	EB	ASTM D1498-76M
Solids, Percent	87.7		%	1	03/14/19 14:00	BG	SM2540 G 18TH ED MOD
pH	8.05 J		su	1	03/17/19 15:59	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190313)-A	Date Sampled: 03/13/19
Lab Sample ID: JC84311-1A	Date Received: 03/13/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46306

(2) Prep QC Batch: MP13124

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190313)-A	Date Sampled: 03/13/19
Lab Sample ID: JC84311-1A	Date Received: 03/13/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/14/19 15:14	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-B0	Date Sampled: 03/13/19
Lab Sample ID: JC84311-2A	Date Received: 03/13/19
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.8	1.1	mg/kg	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.0	4.5	mg/kg	1	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.2	2.2	mg/kg	2	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	24.3	11	mg/kg	2	03/14/19	03/14/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46306

(2) Prep QC Batch: MP13116

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-B0	Date Sampled: 03/13/19
Lab Sample ID: JC84311-2A	Date Received: 03/13/19
Matrix: SO - Soil	Percent Solids: 87.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.3	1.6	mg/kg	1	03/27/19 16:46	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
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TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	JC84441

Client / Reporting Information		Project Information				Requested Analysis												Matrix Codes																																													
Company Name: Arcadis		Project Name: PPG Jersey City Site 107																DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SS - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WFP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																																													
Street Address: 16 FRIEND LANE, SUITE 100 City: NEWTOWN, PA 18940 Project Code: MATH:WB:11 Phone #: 610-755-7080		Street: 10 CHAPEL AVENUE City: Jersey City NJ Project #: NP000770.0003 Client Purchase Order #				Billing Information (if different from Report to) Company Name Street Address City State Zip																																																									
Sample(s) Name(s): C. Cifelli		Project Manager: Jim McLaughlin, Jr.				Attention: Number of preserved bottles: HCl, NH4, HNO3, H2SO4, NONE, DI Water, MICH, ENDOSE																																																									
SSS Series #		MEQ/MDI Vial #				Matrix: FB, SO # of bottles: 2, 1 HCl, NH4, HNO3, H2SO4, NONE, DI Water, MICH, ENDOSE																																																									
Field ID / Point of Collection		Date		Time		Sampled by		Grab (G) / Composite (C)		Matrix												LAB USE ONLY																																									
1 FB(20190314)-A		3/14/19		1330		CC		G		FB		Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Palladium Vanadium Nickel										624 A9 B25																																									
7 BS-B0-2		3/14/19		1315		CC		G		SO																																																					
Turn Around Time (Business Days)																Deliverable																Comments / Special Instructions																															
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other																Approved By (SGS PM) / Date: Commercial "A" (Level 1) Commercial "B" (Level 2) NJ Reduced (Level 3) Full Tier 1 (Level 4) Commercial "C" NJ DKQP																NYASP Category A NYASP Category B MA MCP Criteria CT RCP Criteria State Forms <input checked="" type="checkbox"/> EDD Format <u>EDW</u> DDD-QSMS																INITIAL ASSESSMENT 3A (A) LABEL VERIFICATION http://www.sgs.com/en/terms-and-conditions															
Relinquished By: <u>[Signature]</u> Date / Time: 3/14/19 1453																Received By: <u>[Signature]</u> Date / Time: 3-14-19 19:35																Relinquished By: <u>[Signature]</u> Date / Time: 3-14-19																Received By: <u>[Signature]</u> Date / Time: 3-14-19															
Relinquished By: <u>[Signature]</u> Date / Time:																Received By: <u>[Signature]</u> Date / Time:																Relinquished By: <u>[Signature]</u> Date / Time:																Received By: <u>[Signature]</u> Date / Time:															
Custody Seal # 25090 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact																Preserved where applicable <input type="checkbox"/> Present <input type="checkbox"/> Absent																On Ice <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																Cooler Temp. °C 2.3°C <u>[Signature]</u>															

5.2
5



Report of Analysis

Client Sample ID: FB(20190314)-A	Date Sampled: 03/14/19
Lab Sample ID: JC84441-1	Date Received: 03/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/15/19	JOO	SW846 7196A
Redox Potential Vs H2	516		mv	1	03/18/19 12:25	RI	ASTM D1498-76
pH ^a	5.41		su	1	03/14/19 20:08	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-BO-2	Date Sampled: 03/14/19
Lab Sample ID: JC84441-2	Date Received: 03/14/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.9 J	0.48	mg/kg	1	03/29/19 16:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	385		mv	1	03/17/19 16:25	EB	ASTM D1498-76M
Solids, Percent	83.5		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	8.32 J		su	1	03/17/19 16:16	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190314)-A	Date Sampled: 03/14/19
Lab Sample ID: JC84441-1A	Date Received: 03/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46314

(2) Prep QC Batch: MP13154

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190314)-A	Date Sampled: 03/14/19
Lab Sample ID: JC84441-1A	Date Received: 03/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/15/19 16:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-BO-2		Date Sampled: 03/14/19
Lab Sample ID: JC84441-2A		Date Received: 03/14/19
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	234	1.2	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	34.7	4.6	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	49.6	5.8	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46314

(2) Prep QC Batch: MP13116

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-BO-2		Date Sampled: 03/14/19
Lab Sample ID: JC84441-2A		Date Received: 03/14/19
Matrix: SO - Soil		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	223	1.7	mg/kg	1	03/29/19 16:05	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC84442

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, Comments / Special Instructions, Sample Chain of Custody table, and Custody Seal information.

5.2
5



Report of Analysis

Client Sample ID: FB(20190314)	Date Sampled: 03/14/19
Lab Sample ID: JC84442-1	Date Received: 03/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/15/19	JOO	SW846 7196A
Redox Potential Vs H2	520		mv	1	03/18/19 12:30	RI	ASTM D1498-76
pH ^a	5.21		su	1	03/14/19 20:10	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F18	Date Sampled: 03/14/19
Lab Sample ID: JC84442-2	Date Received: 03/14/19
Matrix: SO - Soil	Percent Solids: 67.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	03/22/19 16:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	88.4		mv	1	03/17/19 16:32	EB	ASTM D1498-76M
Solids, Percent	67.6		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.42 J		su	1	03/17/19 16:32	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190314)		Date Sampled: 03/14/19
Lab Sample ID: JC84442-1A		Date Received: 03/14/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46314

(2) Prep QC Batch: MP13154

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190314)	Date Sampled: 03/14/19
Lab Sample ID: JC84442-1A	Date Received: 03/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/15/19 16:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F18		Date Sampled: 03/14/19
Lab Sample ID: JC84442-2A		Date Received: 03/14/19
Matrix: SO - Soil		Percent Solids: 67.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	23.8	1.5	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.3	5.9	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.3	7.4	mg/kg	1	03/15/19	03/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46314

(2) Prep QC Batch: MP13116

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F18		Date Sampled: 03/14/19
Lab Sample ID: JC84442-2A		Date Received: 03/14/19
Matrix: SO - Soil		Percent Solids: 67.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.8	2.1	mg/kg	1	03/22/19 16:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SP
FB

CHAIN OF CUSTODY

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www.sgs.com/ehsusa

FED-EX Tracking #
SGS Quote #
Both Party Control
SGS Job # **3A-011719-182**
JC84506

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)												Matrix Codes							
Company Name Arcadis		Project Name PPG Site 107 (Jersey City)				<div style="display: flex; justify-content: space-around;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Tri-valent Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Hexavalent Chromium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Antimony</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Nickel</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Thallium</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Vanadium</div> </div>												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB-Field Blank EB-Equipment Blank RB- Rinse Blank TB-Trip Blank							
Street Address 10 Friends Lane Suite 100		Street 18 Chapel Avenue		Billing Information (if different from Report to)																					
City, State, Zip Newtown PA 18940		City, State Jersey City NJ		Company Name																					
Project Contact Matthew Bell		Project # NP000770.0003		Street Address																					
Phone # 610-255-7080		Client Purchase Order #		City, State, Zip																					
Sample Name(s) D. Hilinski; Cont. state		Project Manager Jim McLaughlin, Jr.		Attention:																					
Lab Sample #		MECH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles										LAB USE ONLY	
1		FB(20190315)		3/15/19		1130		CC		FB		2		<input checked="" type="checkbox"/> HCl <input checked="" type="checkbox"/> HNO3 <input checked="" type="checkbox"/> H2SO4 <input checked="" type="checkbox"/> NONE <input type="checkbox"/> DI Water <input type="checkbox"/> MEQI <input type="checkbox"/> ENCORE										A9	
2		BS-F17		3/15/19		0945		DH		SO		1												G44 B8	
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:				Data Deliverable Information												Comments / Special Instructions							
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDU1 <input type="checkbox"/> Other												INITIAL ASSESSMENT JR 3A LABEL VERIFICATION							
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				Sample inventory is verified upon receipt in the Laboratory																			
Relinquished by Sampler [Signature]		Date Time 3/15/19 1410		Received By [Signature]		Date Time 3/15/19 1557		Relinquished By [Signature]		Date Time 3/15/19 1557		Received By [Signature]													
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:													
5				5				Custody Seal # 23214		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable		On Ice		Cooler Temp 3.2°C									



5.2
5

Report of Analysis

Client Sample ID: FB(20190315)		Date Sampled: 03/15/19
Lab Sample ID: JC84506-1		Date Received: 03/15/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/15/19 22:33	JOO	SW846 7196A
Redox Potential Vs H2	542		mv	1	03/18/19 00:15	EB	ASTM D1498-76
pH ^a	5.34		su	1	03/14/19 17:16	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F17	Date Sampled: 03/15/19
Lab Sample ID: JC84506-2	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54	0.54	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	241		mv	1	03/21/19 22:52	EB	ASTM D1498-76M
Solids, Percent	73.7		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	6.54 J		su	1	03/21/19 22:04	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190315)		Date Sampled: 03/15/19
Lab Sample ID: JC84506-1A		Date Received: 03/15/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13173

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190315)		Date Sampled: 03/15/19
Lab Sample ID: JC84506-1A		Date Received: 03/15/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/18/19 14:02	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F17	Date Sampled: 03/15/19
Lab Sample ID: JC84506-2A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	16.2	1.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	13.6	5.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.7	6.9	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F17		Date Sampled: 03/15/19
Lab Sample ID: JC84506-2A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.2	1.9	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

SP
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
SGS Quote #
Box Number Control # AV-03819-108
SGS Job # JC84519

Client / Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes		
Company Name Ancodis		Project Name PPG SITE 107 (Jersey City)		Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address 10 Friends Lane, Suite 100 Newtown, PA 18940		Street 18 Chapel Avenue Jersey City, NJ														
Project Contact Matthew Bell Phone # 610-755-7080 E-mail C.Cifelli 201244.8065		Billing Information (if different from Report to) Company Name Project # NJ 600770.0803 Street Address City State Zip														
Sampler(s) Name(s) C. Cifelli		Project Manager Tim McLoughlin Jr.														
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	PIC	NH3	PHOS	PEROX	NONE	DI Water	MICH	ENCORE	LAB USE ONLY
1	FB(20190315) - A		3/15/19	1115	CC	FB	2									C6
2	SW-A8 (2.0-2.5)		3/15/19	0920	CC	SO	1									A9
3	SW-A8 (4.0-4.0)		3/15/19	0925	CC	SO	1									G44
4	SW-A8 (4.0-6.0)		3/15/19	0930	CC	SO	1									
5	10B-M018W2		3/15/19	0935	CC	SO	1									
6	10B-M018W1		3/15/19	0940	CC	SO	1									
7	SW-A7 (0.0-0.5)		3/15/19	0945	CC	SO	1									
8	SW-A7 (2.0-2.5)		3/15/19	0950	CC	SO	1									
9	SW-A7 (4.0-4.5)		3/15/19	0955	CC	SO	1									
10	SW-A7 (4.0-4.5) MS		3/15/19	0955	CC	SO	1									
	DUP-04(20190315) RR		3/15/19	-	CC	SO	1									
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information										Comments / Special Instructions		
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULL T1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary</small>										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other <small>NJ Reduced = Results + QC Summary + Partial Raw data</small>	INITIAL ASSESSMENT <u>JK JB</u> LABEL VERIFICATION _____	
Emergency & Rush T/A data available via LabLink																
Sample Custody must be documented below each time samples change possession, including courier delivery.																
1	Relinquished by Sampler: <u>[Signature]</u>	Date Time: 3/15/19 1410	Received By: <u>[Signature]</u>	1	Relinquished By: <u>[Signature]</u>	2	Relinquished By: <u>[Signature]</u>	Date Time: 1558	Received By: <u>[Signature]</u>	2	Relinquished By:	Date Time:	Received By:	4	Relinquished By:	Received By:
3	Relinquished by Sampler:	Date Time:	Received By:	3	Relinquished By:	4	Relinquished By:	Date Time:	Received By:	4	Relinquished By:	Date Time:	Received By:	4	Relinquished By:	Received By:
5	Relinquished by:	Date Time:	Received By:	5	Custody Seal # 19418	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable		On Ice <input checked="" type="checkbox"/> Cooler Temp. <u>1.5</u> 3.2 oc						

5.2
5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, and Sample Custody sections.

5.2
5



Report of Analysis

Client Sample ID: FB(20190315)-A		Date Sampled: 03/15/19
Lab Sample ID: JC84519-1		Date Received: 03/15/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/15/19 22:33	JOO	SW846 7196A
Redox Potential Vs H2	488		mv	1	03/21/19 00:15	EB	ASTM D1498-76
pH ^a	5.46		su	1	03/15/19 17:40	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A8(2.0-2.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-2	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	17.0 J	0.50	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	348		mv	1	03/21/19 20:58	EB	ASTM D1498-76M
Solids, Percent	80		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.18 J		su	1	03/21/19 20:48	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A8(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-3	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ	0.46	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	374		mv	1	03/21/19 21:04	EB	ASTM D1498-76M
Solids, Percent	86.5		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.17 J		su	1	03/21/19 20:50	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A8(6.0-6.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-4	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ	0.46	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	373		mv	1	03/21/19 21:06	EB	ASTM D1498-76M
Solids, Percent	87.6		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.17 J		su	1	03/21/19 20:52	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M018W2	Date Sampled: 03/15/19
Lab Sample ID: JC84519-5	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.48 J	0.46	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	03/21/19 21:47	EB	ASTM D1498-76M
Solids, Percent	87.1		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.63 J		su	1	03/21/19 20:59	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018W1		Date Sampled: 03/15/19
Lab Sample ID: JC84519-6		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.1 J	0.46	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	308		mv	1	03/21/19 21:51	EB	ASTM D1498-76M
Solids, Percent	86.9		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.61 J		su	1	03/21/19 21:04	EB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A7(0.0-0.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-7	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.5 J	0.50	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	03/21/19 21:57	EB	ASTM D1498-76M
Solids, Percent	79.7		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.33 J		su	1	03/21/19 21:07	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A7(2.0-2.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-8	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.0 J	0.49	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	468		mv	1	03/21/19 22:17	EB	ASTM D1498-76M
Solids, Percent	81.8		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.18 J		su	1	03/21/19 21:13	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A7(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-9	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0 J	0.48	mg/kg	1	03/22/19 16:23	RI	SW846 3060A/7196A
Redox Potential Vs H2	416		mv	1	03/21/19 20:49	EB	ASTM D1498-76M
Solids, Percent	83.9		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	5.19 J		su	1	03/21/19 20:44	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-04(20190315)RR	Date Sampled: 03/15/19
Lab Sample ID: JC84519-10	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 88.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ	0.45	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	409		mv	1	03/21/19 22:21	EB	ASTM D1498-76M
Solids, Percent	88.7		%	1	03/17/19 12:35	BG	SM2540 G 18TH ED MOD
pH	7.25 J		su	1	03/21/19 21:46	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018_E	Date Sampled: 03/15/19
Lab Sample ID: JC84519-11	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 60.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.67 UJ	0.67	mg/kg	1	03/22/19 16:30	RI	SW846 3060A/7196A
Redox Potential Vs H2	216		mv	1	03/22/19 23:08	EB	ASTM D1498-76M
Solids, Percent	60.1		%	1	03/21/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.75 J		su	1	03/22/19 22:25	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190315)-A	Date Sampled: 03/15/19
Lab Sample ID: JC84519-1A	Date Received: 03/15/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/16/19	03/18/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13173

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190315)-A	Date Sampled: 03/15/19
Lab Sample ID: JC84519-1A	Date Received: 03/15/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/18/19 14:07	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A8(2.0-2.5) Lab Sample ID: JC84519-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 80.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	160	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	19.5	5.0	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	6.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A8(2.0-2.5)		Date Sampled: 03/15/19
Lab Sample ID: JC84519-2A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	143	1.7	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A8(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-3A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	20.2	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	13.7	4.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.4	5.6	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A8(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-3A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 86.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.2	1.6	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A8(6.0-6.5) Lab Sample ID: JC84519-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 87.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	16.6	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.8	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.8	6.0	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A8(6.0-6.5)		Date Sampled: 03/15/19
Lab Sample ID: JC84519-4A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.2	1.7	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: 108_M018W2 Lab Sample ID: JC84519-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 87.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	32.0	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.9	4.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.1	5.6	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: 108_M018W2	Date Sampled: 03/15/19
Lab Sample ID: JC84519-5A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	31.5	1.6	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018W1 Lab Sample ID: JC84519-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 86.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	149	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	20.0	4.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.2	2.2	mg/kg	2	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.5	5.6	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 108_M018W1		Date Sampled: 03/15/19
Lab Sample ID: JC84519-6A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	146	1.6	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A7(0.0-0.5) Lab Sample ID: JC84519-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 79.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	691	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	22.5	4.9	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	46.0	6.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A7(0.0-0.5)		Date Sampled: 03/15/19
Lab Sample ID: JC84519-7A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	679	1.7	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A7(2.0-2.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-8A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	317	1.3	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	17.6	5.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	44.8	6.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A7(2.0-2.5)		Date Sampled: 03/15/19
Lab Sample ID: JC84519-8A		Date Received: 03/15/19
Matrix: SO - Soil		Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	313	1.8	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A7(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-9A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	67.1	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	4.7	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.3	5.9	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A7(4.0-4.5)	Date Sampled: 03/15/19
Lab Sample ID: JC84519-9A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 83.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	65.1	1.7	mg/kg	1	03/22/19 16:23	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-04(20190315)RR	Date Sampled: 03/15/19
Lab Sample ID: JC84519-10A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 88.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	15.6	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	4.6	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.4	5.7	mg/kg	1	03/15/19	03/18/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46320

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-04(20190315)RR	Date Sampled: 03/15/19
Lab Sample ID: JC84519-10A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 88.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.2	1.6	mg/kg	1	03/22/19 16:30	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 108_M018_E Lab Sample ID: JC84519-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/15/19 Date Received: 03/15/19 Percent Solids: 60.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.9 J-	3.2	mg/kg	1	03/28/19	03/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	1210	1.6	mg/kg	1	03/28/19	03/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	40.7	6.3	mg/kg	1	03/28/19	03/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	03/28/19	03/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	59.3	7.9	mg/kg	1	03/28/19	03/29/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46390

(2) Prep QC Batch: MP13594

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: 108_M018_E	Date Sampled: 03/15/19
Lab Sample ID: JC84519-11A	Date Received: 03/15/19
Matrix: SO - Soil	Percent Solids: 60.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1210	2.3	mg/kg	1	03/29/19 14:23	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC84633 and JC85175

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33445R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC84633 and JC85175 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC84633	FB(20190318)-A	JC84633-1	Water	3/18/2019		X	X	X
	SW-A9(0.0-0.5)	JC84633-2	Soil	3/18/2019		X	X	X
	SW-A9(2.0-2.5)	JC84633-3	Soil	3/18/2019		X	X	X
	SW-A9(4.0-4.5)	JC84633-4	Soil	3/18/2019		X	X	X
	SW-A9(5.5-6.0)	JC84633-5	Soil	3/18/2019		X	X	X
	SW-A10(4.0-4.5)	JC84633-6	Soil	3/18/2019		X	X	X
	SW-A10(6.0-6.5)	JC84633-7	Soil	3/18/2019		X	X	X
	SW-A10(7.5-8.0)	JC84633-8	Soil	3/18/2019		X	X	X
JC85175	FB(20190326)	JC85175-1	Water	3/26/2019		X	X	X
	SW-A58(0.0-0.5)	JC85175-2	Soil	3/26/2019		X	X	X
	SW-A58(2.0-2.5)	JC85175-3	Soil	3/26/2019		X	X	X
	SW-A58(4.0-4.5)	JC85175-4	Soil	3/26/2019		X	X	X
	SW-A58(5.0-5.5)	JC85175-5	Soil	3/26/2019		X	X	X
	BS-J5	JC85175-6	Soil	3/26/2019		X	X	X
	107_D019	JC85175-7	Soil	3/26/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDG #JC84633: The MS/MSD analysis was not performed using a sample from this SDG.

SDG #JC85175: The MS/MSD analysis performed on sample location SW-A58(4.0-4.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A58(4.0-4.5)	Antimony	55.3%	53.0%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

SDG #JC84633: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDG #JC85175: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A58(4.0-4.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDG #JC84633: The serial dilution analysis was not performed using a sample from this SDG.

SDG #JC85175: The serial dilution analysis performed using sample SW-A58(4.0-4.5) exhibited %D within the control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC84633: The MS analysis performed on sample location SW-A9(5.5-6.0) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC85175: The MS analysis performed on sample location SW-A58(4.0-4.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC84633: The MS analysis performed on sample location SW-A9(5.5-6.0) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A9(5.5-6.0)	Hexavalent Chromium, Soluble	> 125%	65.8%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC84633: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC84633 and JC85175: The PDS analysis performed on sample locations SW-A9(5.5-6.0) and SW-A58(4.0-4.5) exhibited recoveries within the control limits.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDG #JC85175: The laboratory duplicate analysis performed on sample location SW-A58(4.0-4.5) exhibited results within the control limit.

SDG #JC84633: All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
SW-A9(5.5-6.0)	Hexavalent Chromium	$> \pm$ RL

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result $>$ four times the RL	$> 20\%$	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result $<$ four times the RL	\pm RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A9(0.0-0.5) SW-A9(2.0-2.5) SW-A9(4.0-4.5) SW-A9(5.5-6.0) SW-A10(4.0-4.5) SW-A10(6.0-6.5) SW-A10(7.5-8.0)	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
SW-A58(0.0-0.5) SW-A58(2.0-2.5) SW-A58(4.0-4.5) SW-A58(5.0-5.5) BS-J5 107_D019		Analysis: 7 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC84633: The laboratory duplicate analysis performed on sample location SW-A9(0.0-0.5) exhibited results within the control limit.

SDG #JC85175: The laboratory duplicate analysis was not performed using a sample from this SDG.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 15, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
PB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	AY-03519-108
	JC 84633

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes
Company Name Arcadis		Project Name PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Vanadium Nickel Thallium							DW - Drinking Water GW - Ground Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB-Field Blank EB-Equipment Blank RB- Rinse Blank TB-Trip Blank
Street Address 10 Friends Lane, Suite 100		Street 10 Chapel Avenue		Billing Information (if different from Report to)															
City Newtown PA 18940		City Jersey City NJ		Company Name															
Project Contact Krista Mastrosola		Project # NF000770.0003		Street Address															
Phone # 610.755.7080		Client Purchase Order #		City															
Fax #		Project Manager Jim McLaughlin		State															
Sample(s) Name(s) Christa Cifelli		Phone # 610.264.8065		Zip															
Attention:																			
Lab Sample #	Field ID / Point of Collection	MECHDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NH3	HNO3	H2SO4	HNO2	DI Water	MEDIA	ENCLOSURE	LAB USE ONLY			
1	FB(20190318)-A		3/10/19	1030	CC	FB	2									A13			
2	SW-A9(0.0-0.5)		3/18/19	1200	CC	SO	1									M4			
3	SW-A9(2.0-2.5)		3/10/19	1205	CC	SO	1												
4	SW-A9(4.0-4.5)		3/18/19	1210	CC	SO	1									D19			
5	SW-A9(5.5-6.0)		3/18/19	1215	CC	SO	1												
6	SW-A10(4.0-4.5)		3/18/19	1225	CC	SO	1												
7	SW-A10(6.0-6.5)		3/18/19	1230	CC	SO	1												
8	SW-A10(7.5-8.0)		3/18/19	1235	CC	SO	1												
Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions							
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____		Approved by (SGS Project Manager)/Date:		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format <i>EDU.S</i> <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other _____ <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting										INITIAL ASSESSMENT <i>300</i> LABEL VERIFICATION _____					
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										Sample inventory is verified upon receipt in the Laboratory							
Sample Custody must be documented below each time samples change possession, including courier delivery.																			
Relinquished by: <i>[Signature]</i>	Date Time: 2/18/19 14:25	Received By: <i>Robert Chambers</i>	Relinquished By: <i>Robert Chambers</i>	Date Time: 3/18/19 16:23	Received By: <i>[Signature]</i>														
Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:														
Relinquished by:	Date Time:	Received By:	Custody Seal # <i>14152</i>	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp: <i>3:10C</i>												

5.2
5



Report of Analysis

Client Sample ID: FB(20190318)-A	Date Sampled: 03/18/19
Lab Sample ID: JC84633-1	Date Received: 03/18/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/18/19 23:15	JO	SW846 7196A
Redox Potential Vs H2	465		mv	1	03/22/19 23:20	EB	ASTM D1498-76
pH ^a	4.06		su	1	03/18/19 17:00	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A9(0.0-0.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-2	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 78.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	40.5 J	0.51	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	529		mv	1	03/22/19 20:29	EB	ASTM D1498-76M
Solids, Percent	78.7		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.33 J		su	1	03/22/19 20:02	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A9(2.0-2.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-3	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J	0.58	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	777		mv	1	03/22/19 20:39	EB	ASTM D1498-76M
Solids, Percent	68.5		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	5.67 J		su	1	03/22/19 20:06	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A9(4.0-4.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-4	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0 J	0.48	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	593		mv	1	03/22/19 20:46	EB	ASTM D1498-76M
Solids, Percent	83.8		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	6.62 J		su	1	03/22/19 20:11	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A9(5.5-6.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-5	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J	0.47	mg/kg	1	04/01/19 13:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	398		mv	1	03/22/19 22:06	EB	ASTM D1498-76M
Solids, Percent	85.5		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.60 J		su	1	03/22/19 20:15	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10(4.0-4.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-6	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ	0.48	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	446		mv	1	03/22/19 22:12	EB	ASTM D1498-76M
Solids, Percent	84.2		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	6.69 J		su	1	03/22/19 20:19	EB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A10(6.0-6.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-7	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.95 J	0.51	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	374		mv	1	03/22/19 22:21	EB	ASTM D1498-76M
Solids, Percent	78		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	6.06 J		su	1	03/22/19 20:21	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A10(7.5-8.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-8	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J	0.50	mg/kg	1	04/01/19 13:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	354		mv	1	03/22/19 22:25	EB	ASTM D1498-76M
Solids, Percent	79.7		%	1	03/19/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.52 J		su	1	03/22/19 20:23	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A9(0.0-0.5)

Lab Sample ID: JC84633-2R

Matrix: SO - Soil

Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ

Date Sampled: 03/18/19

Date Received: 03/18/19

Percent Solids: 78.7

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	16.3	0.51	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A9(2.0-2.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-3R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.58	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A9(4.0-4.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-4R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.3	0.48	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A9(5.5-6.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-5R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.47	mg/kg	1	04/11/19 16:05	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A10(4.0-4.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-6R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.2	0.48	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A10(6.0-6.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-7R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A10(7.5-8.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-8R	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8	0.50	mg/kg	1	04/11/19 16:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190318)-A		Date Sampled: 03/18/19
Lab Sample ID: JC84633-1A		Date Received: 03/18/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/19/19	03/19/19 ND	SW846 6010D ¹	SW846 3010A ³
Chromium	< 10	10	ug/l	1	03/19/19	03/20/19 GT	SW846 6010D ²	SW846 3010A ³
Nickel	< 10	10	ug/l	1	03/19/19	03/19/19 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 10	10	ug/l	1	03/19/19	03/19/19 ND	SW846 6010D ¹	SW846 3010A ³
Vanadium	< 50	50	ug/l	1	03/19/19	03/20/19 GT	SW846 6010D ²	SW846 3010A ³

(1) Instrument QC Batch: MA46328

(2) Instrument QC Batch: MA46330

(3) Prep QC Batch: MP13209

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190318)-A	Date Sampled: 03/18/19
Lab Sample ID: JC84633-1A	Date Received: 03/18/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/20/19 09:17	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A9(0.0-0.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-2A	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 78.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	135	1.3	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.1	5.2	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	63.9	6.5	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46328

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A9(0.0-0.5)		Date Sampled: 03/18/19
Lab Sample ID: JC84633-2A		Date Received: 03/18/19
Matrix: SO - Soil		Percent Solids: 78.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	94.5	1.8	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A9(2.0-2.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-3A	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	34.0	1.4	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	40.6	5.7	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.0	7.2	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46328

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A9(2.0-2.5)		Date Sampled: 03/18/19
Lab Sample ID: JC84633-3A		Date Received: 03/18/19
Matrix: SO - Soil		Percent Solids: 68.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.4	2.0	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A9(4.0-4.5) Lab Sample ID: JC84633-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/18/19 Date Received: 03/18/19 Percent Solids: 83.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	33.8	1.1	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	17.2	4.6	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.1	5.7	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46330

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A9(4.0-4.5)		Date Sampled: 03/18/19
Lab Sample ID: JC84633-4A		Date Received: 03/18/19
Matrix: SO - Soil		Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.8	1.6	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A9(5.5-6.0) Lab Sample ID: JC84633-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/18/19 Date Received: 03/18/19 Percent Solids: 85.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	55.7	1.2	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	21.5	4.7	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.6	5.8	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46330

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A9(5.5-6.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-5A	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.0	1.7	mg/kg	1	04/01/19 13:42	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10(4.0-4.5) Lab Sample ID: JC84633-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/18/19 Date Received: 03/18/19 Percent Solids: 84.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	36.4	1.2	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.2	4.9	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.7	6.1	mg/kg	1	03/18/19	03/19/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46328

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10(4.0-4.5)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-6A	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.0	1.7	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10(6.0-6.5) Lab Sample ID: JC84633-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/18/19 Date Received: 03/18/19 Percent Solids: 78.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	23.9	1.2	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	20.0	5.0	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.7	6.2	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46330

(2) Prep QC Batch: MP13172

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A10(6.0-6.5)		Date Sampled: 03/18/19
Lab Sample ID: JC84633-7A		Date Received: 03/18/19
Matrix: SO - Soil		Percent Solids: 78.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.0	1.7	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A10(7.5-8.0)	Date Sampled: 03/18/19
Lab Sample ID: JC84633-8A	Date Received: 03/18/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	17.7	1.3	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	15.1	5.1	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.1	6.4	mg/kg	1	03/18/19	03/19/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46330

(2) Prep QC Batch: MP13172

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A10(7.5-8.0)		Date Sampled: 03/18/19
Lab Sample ID: JC84633-8A		Date Received: 03/18/19
Matrix: SO - Soil		Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.4	1.8	mg/kg	1	04/01/19 13:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4



SO
EB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E

FED-EX Tracking #
SGS Quote #
Matrix Code
03519-108
J85175

Client / Reporting Information				Project Information				Requested Analysis										Matrix Codes				
Company Name: Arcadis				Project Name: PPG Jersey City S.W. 107				Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank				
Street Address: 10 Friend Lane				Street: 18 Chapel Ave.																		
City: Newtown PA				City: Jersey City NJ																		
Project Contact: Krista Molecuda				Project #: NP000370001																		
Sampler(s) Name(s): Christin C. Kelly				Project Manager: Jim McLaughlin																		
SGS Sample #	Field ID / Point of Collection	MEDIA/ Via #	Date	Time	Sampled by	QAC (V) Cont. (C)	Matrix	# of bottles	HC	MSOH	MSOD	MSOC	MSOE	MSOF	MSOG	MSOH	MSOD	MSOC	MSOE	MSOF	MSOG	LAB USE ONLY
1	EB (20190326)		3/26/19	1145	CC	G	FB	2														A16
2	SW-ASB (0.0 - 0.5)		3/26/19	1330	CC	G	SO	1														M5
3	SW-ASB (2.0 - 2.5)		3/26/19	1335	CC	G	SO	1														D24
4	SW-ASB (4.0 - 4.5)		3/26/19	1340	CC	G	SO	1														
5	SW-ASB (5.0 - 5.5)		3/26/19	1345	CC	G	SO	1														
6	BS-TS		3/26/19	1350	CC	G	SO	1														
7	107-D019		3/26/19	1355	CC	G	SC	1														
Turn Around Time (Business Days)				Deliverable				Comments / Special Instructions														
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other				Approved By (SGS PM) / Date: _____				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Full				<input type="checkbox"/> DOD-QSMS						
All data available via Lablink				* Approval needed for 1-3 Business Day TAT				Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions														
Relinquished by: [Signature]				Date / Time: 3/26/19				Received by: Robert Chambers				Date / Time: 3/26/19				Received by: [Signature]						
Relinquished by: [Signature]				Date / Time: 3/26/19				Received by: [Signature]				Date / Time: 3/26/19				Received by: [Signature]						
Relinquished by: [Signature]				Date / Time: 3/26/19				Received by: [Signature]				Date / Time: 3/26/19				Received by: [Signature]						
								Custody Seal # 23212				<input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input type="checkbox"/> Absent				Preserved where applicable <input type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp: 3.2°C						

INITIAL ASSESSMENT **[Signature]**
LABEL VERIFICATION

12-FORM-Dayton - Standard COC .xlsx



5.2
5

Report of Analysis

Client Sample ID: FB(20190326) Lab Sample ID: JC85175-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/26/19 Date Received: 03/26/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/26/19 23:10	JO	SW846 7196A
Redox Potential Vs H2	472		mv	1	03/29/19 20:30	EB	ASTM D1498-76
pH ^a	4.48		su	1	03/26/19 19:17	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A58(0.0-0.5)	Date Sampled: 03/26/19
Lab Sample ID: JC85175-2	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	36.7	0.49	mg/kg	1	04/02/19 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	300		mv	1	04/01/19 02:00	EB	ASTM D1498-76M
Solids, Percent	82.3		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	7.03 J		su	1	04/02/19 02:00	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A58(2.0-2.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-3		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/02/19 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	308		mv	1	04/01/19 02:15	EB	ASTM D1498-76M
Solids, Percent	82.5		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	5.55 J		su	1	04/02/19 02:15	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A58(4.0-4.5)	Date Sampled: 03/26/19
Lab Sample ID: JC85175-4	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	04/02/19 12:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	327		mv	1	04/01/19 02:30	EB	ASTM D1498-76M
Solids, Percent	90.4		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	5.95 J		su	1	04/02/19 02:30	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A58(5.0-5.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-5		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	04/02/19 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	336		mv	1	04/01/19 02:36	EB	ASTM D1498-76M
Solids, Percent	86.2		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	6.59 J		su	1	04/02/19 02:36	EB	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-J5	Date Sampled: 03/26/19
Lab Sample ID: JC85175-6	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.45	mg/kg	1	04/02/19 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	321		mv	1	04/01/19 02:45	EB	ASTM D1498-76M
Solids, Percent	89.5		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	7.69 J		su	1	04/02/19 02:45	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_D019	Date Sampled: 03/26/19
Lab Sample ID: JC85175-7	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	04/02/19 12:51	RI	SW846 3060A/7196A
Redox Potential Vs H2	317		mv	1	04/01/19 02:55	EB	ASTM D1498-76M
Solids, Percent	93		%	1	03/27/19 08:58	RC	SM2540 G 18TH ED MOD
pH	6.89 J		su	1	04/02/19 02:55	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190326)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-1A		Date Received: 03/26/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	03/27/19	03/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	03/27/19	03/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	03/27/19	03/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	03/27/19	03/27/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	03/27/19	03/27/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13520

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190326)	Date Sampled: 03/26/19
Lab Sample ID: JC85175-1A	Date Received: 03/26/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	03/27/19 16:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A58(0.0-0.5) Lab Sample ID: JC85175-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/26/19 Date Received: 03/26/19 Percent Solids: 82.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.8 J-	2.4	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	111	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	25.3	4.7	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.8	5.9	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A58(0.0-0.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-2A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	74.3	1.7	mg/kg	1	04/02/19 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A58(2.0-2.5)	Date Sampled: 03/26/19
Lab Sample ID: JC85175-3A	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.4	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.9	4.9	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.8	6.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A58(2.0-2.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-3A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.4	1.7	mg/kg	1	04/02/19 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A58(4.0-4.5) Lab Sample ID: JC85175-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/26/19 Date Received: 03/26/19 Percent Solids: 90.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	03/26/19	03/27/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.5	1.1	mg/kg	1	03/26/19	03/27/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.4	mg/kg	1	03/26/19	03/27/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/26/19	03/27/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.1	5.5	mg/kg	1	03/26/19	03/27/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A58(4.0-4.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-4A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.5	mg/kg	1	04/02/19 12:43	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A58(5.0-5.5)	Date Sampled: 03/26/19
Lab Sample ID: JC85175-5A	Date Received: 03/26/19
Matrix: SO - Soil	Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.4	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.2	4.7	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	5.9	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A58(5.0-5.5)		Date Sampled: 03/26/19
Lab Sample ID: JC85175-5A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 86.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.4	1.7	mg/kg	1	04/02/19 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J5		Date Sampled: 03/26/19
Lab Sample ID: JC85175-6A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	25.3	1.1	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	20.5	4.3	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.8	5.4	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J5		Date Sampled: 03/26/19
Lab Sample ID: JC85175-6A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 89.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.7	1.6	mg/kg	1	04/02/19 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: 107_D019 Lab Sample ID: JC85175-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/26/19 Date Received: 03/26/19 Percent Solids: 93.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10.5	1.1	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.7	4.3	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	15.8	5.4	mg/kg	1	03/26/19	03/27/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46374

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: 107_D019		Date Sampled: 03/26/19
Lab Sample ID: JC85175-7A		Date Received: 03/26/19
Matrix: SO - Soil		Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.5	1.5	mg/kg	1	04/02/19 12:51	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Semivolatile Organic Compounds, Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC85448

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33446R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC85448 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis			
					SVOC	Cr VI	MET	MISC
FB(20190329)	JC85448-1	Water	3/29/2019			X	X	X
SW-A57(0.0-0.5)	JC85448-2	Soil	3/29/2019			X	X	X
SW-A57(2.0-2.5)	JC85448-3	Soil	3/29/2019			X	X	X
SW-A57(4.0-4.5)	JC85448-4	Soil	3/29/2019			X	X	X
SW-A57(5.5-6.0)	JC85448-5	Soil	3/29/2019			X	X	X
BS-K5	JC85448-6	Soil	3/29/2019			X	X	X
BS-I5A	JC85448-7	Soil	3/29/2019			X	X	X
DUP-23(20190329)	JC85448-8	Soil	3/29/2019	SW-A57(5.5-6.0)		X	X	X
BS-D19A	JC85448-9	Soil	3/29/2019			X	X	X
BS-E19	JC85448-10	Soil	3/29/2019			X	X	X
BS-E20	JC85448-11	Soil	3/29/2019			X	X	X
CS-E20	JC85448-12	Soil	3/29/2019			X	X	X
SW-FS-01	JC85448-13	Soil	3/29/2019		X	X	X	X
SW-FS-02	JC85448-14	Soil	3/29/2019		X	X	X	X
SW-FS-03	JC85448-15	Soil	3/29/2019		X	X	X	X
SW-FS-04	JC85448-16	Soil	3/29/2019		X	X	X	X
BS-FS-01	JC85448-17	Soil	3/29/2019		X	X	X	X
BS-FS-02	JC85448-18	Soil	3/29/2019		X	X	X	X

Notes:

1. Metals for samples JC85448-2 through JC85448-12 include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Metals for samples JC85448-1, and JC85448-13 through JC-85448-18 includes target analyte list metals.
3. Cr VI is hexavalent chromium.
4. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8270D. Data were reviewed in accordance with USEPA Region 2 SOP HW-35, Revision 1 (August 2007); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

DATA REVIEW REPORT

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
SW-FS-01 SW-FS-02 SW-FS-03 SW-FS-04 BS-FS-01 BS-FS-02	TIC: System Artifact RT 2.63 (MB)	Detected sample results less than 5 times blank result	R

Note:

MB Method blank
RL Reporting limit

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

DATA REVIEW REPORT

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (20%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the initial calibration verification (ICV) and continuing calibration verification (CCV) must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
SW-FS-01 SW-FS-02 SW-FS-03 SW-FS-04 BS-FS-01 BS-FS-02	Continuing Calibration Verification %D	Pentachlorophenol	+20.8%
		Atrazine	-40.6%
		Butyl benzyl phthalate	-33.3%
		Caprolactam	-39.7%
		2,2'-Oxybis(1-chloropropane)	-23.7%
		3,3'-Dichlorobenzidine	-23.4%
		1,4-Dioxane	+24.2%
		Di-n-butyl phthalate	-25.3%
		bis(2-Ethylhexyl)phthalate	-31.9%
		2-Nitroaniline	-35.8%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

DATA REVIEW REPORT

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF < 0.05	Non-detect	R
		Detect	J
	RRF < 0.01 ¹	Non-detect	R
		Detect	J
	RRF > 0.05 or RRF > 0.01 ¹	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 20% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD > 90%	Non-detect	R
		Detect	J
Continuing Calibration	%D > 20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D > 20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D > 90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

Note:

¹ RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory established

DATA REVIEW REPORT

acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed using sample SW-FS-01 exhibited RPDs between the MS and MSD samples greater than the control limits as presented in the following table.

Sample Locations	Compound
SW-FS-01	4-Nitrophenol
	2,3,4,6-Tetrachlorophenol
	2,4,5-Trichlorophenol
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(g,h,i)perylene
	Benzo(k)fluoranthene
	4-Bromophenyl phenyl ether
	Butyl benzyl phthalate
	2-Chloronaphthalene
	Chrysene
	bis(2-Chloroethoxy)methane
	bis(2-Chloroethyl)ether
	2,2'-Oxybis(1-chloropropane)
	4-Chlorophenyl phenyl ether
	2,4-Dinitrotoluene
	2,6-Dinitrotoluene
	Dibenzo(a,h)anthracene
	Di-n-butyl phthalate
	Di-n-octyl phthalate
	Diethyl phthalate
	Dimethyl phthalate
	bis(2-Ethylhexyl)phthalate
	Fluorene

DATA REVIEW REPORT

Sample Locations	Compound
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachloroethane
	Indeno(1,2,3-cd)pyrene
	Isophorone
	Naphthalene
	Nitrobenzene
	N-Nitroso-di-n-propylamine
	N-Nitrosodiphenylamine
	Pyrene
	1,2,4,5-Tetrachlorobenzene

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory established acceptance limits.

The LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate sample DUP-23(20190329) was not collected for SVOC analysis.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270D	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

DATA REVIEW REPORT

SVOCs: SW-846 8270D	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7470A, 7471B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 7470A	Water	28 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
SW-846 7471B	Soil	28 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

DATA REVIEW REPORT

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed using sample SW-FS-01 in association with mercury analysis exhibited recoveries within the acceptance limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-FS-01 in association with mercury analysis. The MS/MSD recoveries exhibited an acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A57(5.5-6.0) / DUP-23(20190329)	Nickel	11.8	11.3	AC
	Vanadium	18.8	17.3	
	Chromium	13.4	11.6	14.4%
	Trivalent Chromium	12.9	11.6	10.6%

Notes:

AC = Acceptable

The differences in the results between the parent sample SW-A57(5.5-6.0) and field duplicate sample DUP-23(20190329) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 7470A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Cold Vapor Atomic Absorption (CVAA)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-A57(0.0-0.5) in association with the insoluble and soluble hexavalent chromium analysis exhibited recoveries within the control limits.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-A57(0.0-0.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

All analytes associated with laboratory duplicate were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
SW-A57(0.0-0.5)	Hexavalent Chromium	38.4%

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	\pm RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A57(5.5-6.0) / DUP-23(20190329)	Hexavalent Chromium	0.54	0.49 U	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-A57(5.5-6.0) and field duplicate sample DUP-23(20190329) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A57(0.0-0.5) SW-A57(2.0-2.5) SW-A57(4.0-4.5) SW-A57(5.5-6.0) BS-K5 BS-I5A DUP-23(20190329) BS-D19A BS-E19 BS-E20 CS-E20 SW-FS-01 SW-FS-02 SW-FS-03 SW-FS-04 BS-FS-01 BS-FS-02	SW846 9045D	Analysis: 5 days	< 24 hours of receipt by laboratory

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location BS-FS-02 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A57(5.5-6.0) / DUP-23(20190329)	Redox	319	325	1.9%
	pH	5.70	6.06	6.1%

DATA REVIEW REPORT

The differences in the results between the parent sample SW-A57(5.5-6.0) and field duplicate sample DUP-23(20190329) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 16, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
PB

CHAIN OF CUSTODY

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SGS Quote # JC 85448

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes									
Company Name: Arccadis Street Address: 10 Friends Lane, Suite 00 Newtown, PA 18440 City: Newtown, PA State: PA Zip: 18440 Project Contact: Matthew Bell E-mail: Matthew.Bell@arccadis.com Phone #: 610-755-7080 Signature(s) Name(s): Christina Cifelli		Project Name: DPG Site 107 (Jersey City) Street: 18 Chapel Avenue City: Jersey City State: NJ Zip: 07310 Billing Information (if different from Report to): Company Name: NP000720.0003 Street Address: _____ City: _____ State: _____ Zip: _____ Client Purchase Order #: _____ Project #: _____ Project Manager: Tim McLaughlin, Jr. Attention: _____		Requested Analysis: Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Tallium Vanadium TOTAL Metals TOTAL SVOCs												Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank									
SGS Sample #	Field ID / Point of Collection	MEQ/Cl Viol #	Date	Time	Sampled by	One (1) Core (C)	Matrix	# of bottles	RES	NO ₃ H	NO ₂	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃	LAB USE ONLY		
1	FB (20190329)		3/23/19	1100	CC	6	FB	2																	
2	SW-A57(0.0-0.5)		3/23/19	0915	CC	6	SO	1																D28	
3	SW-A57(2.0-2.5)		3/23/19	0920	CC	6	SO	1																A19	
4	SW-A57(4.0-4.5)		3/23/19	0925	CC	6	SO	1																M8	
5	SW-A57(5.5-6.0)		3/23/19	0930	CC	6	SO	1																	
6	BS-KS		3/24/19	0935	CC	6	SO	1																	
	BS-KS M1		3/24/19	0935	CC	6	SO	1																	
	BS-KS M5D		3/24/19	0935	CC	6	SO	1																	
7	BS-ISA		3/23/19	0955	CC	6	SO	1																	
8	DUP-23(20190327)		3/24/19	-	CC	6	SO	1																	
9	BS-D19A		3/24/19	1225	CC	6	SO	1																	
10	BS-E19		3/25/19	1230	CC	6	SO	1																	
Turn Around Time (Business Days)		Approved by (SGS PM) / Date:		Deliverable		Comments / Special Instructions																			
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format: <u>EDW</u>		INITIAL ASSESSMENT <u>LRZ</u> LABEL VERIFICATION _____ http://www.sgs.com/en/terms-and-conditions																			
Relinquished by: <u>Jell</u>		Date / Time: <u>3/23/19 1440</u>		Received By: <u>Robert Chambers</u>		Date / Time: <u>3/29/19</u>		Received By: <u>A</u>																	
Relinquished by: <u>3</u>		Date / Time: _____		Received By: _____		Date / Time: _____		Received By: _____																	
Relinquished by: <u>5</u>		Date / Time: _____		Received By: _____		Date / Time: _____		Received By: _____																	
Custody Seal # <u>14154</u>		Intact <input type="checkbox"/>		Not Intact <input type="checkbox"/>		Preserved where applicable <input type="checkbox"/>		Therm. ID: _____		On Ice <input checked="" type="checkbox"/> Cooler Temp. <u>33°C</u>															

5.2
5

ERSA-QAC-0023-02-FORM-Dayton - Standard COC.atx





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, and Chain of Custody table with columns for Date, Time, Sampled by, and various analysis parameters.

5.2
5



Report of Analysis

Client Sample ID: FB(20190329) Lab Sample ID: JC85448-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	03/29/19 23:10	JO	SW846 7196A
Redox Potential Vs H2	729		mv	1	04/03/19 22:24	EB	ASTM D1498-76
pH ^a	5.60		su	1	03/29/19 18:51	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A57(0.0-0.5)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-2	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	45.9 J	0.93	mg/kg	2	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	04/03/19 21:24	EB	ASTM D1498-76M
Solids, Percent	85.7		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.55 J		su	1	04/03/19 21:31	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A57(2.0-2.5)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-3	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55 J	0.46	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	04/03/19 21:26	EB	ASTM D1498-76M
Solids, Percent	87.2		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.19 J		su	1	04/03/19 21:33	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A57(4.0-4.5)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-4	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55 J	0.46	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	04/03/19 21:27	EB	ASTM D1498-76M
Solids, Percent	86.9		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.72 J		su	1	04/03/19 21:38	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A57(5.5-6.0)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-5	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54 J	0.49	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	319		mv	1	04/03/19 21:29	EB	ASTM D1498-76M
Solids, Percent	81.8		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	5.70 J		su	1	04/03/19 21:39	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K5	Date Sampled: 03/29/19
Lab Sample ID: JC85448-6	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J	0.48	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	331		mv	1	04/03/19 21:30	EB	ASTM D1498-76M
Solids, Percent	82.5		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.19 J		su	1	04/03/19 21:43	EB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-I5A	Date Sampled: 03/29/19
Lab Sample ID: JC85448-7	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ	0.48	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	335		mv	1	04/03/19 21:32	EB	ASTM D1498-76M
Solids, Percent	84		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	7.30 J		su	1	04/03/19 21:48	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-23(20190329)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-8	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ	0.49	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	04/03/19 21:33	EB	ASTM D1498-76M
Solids, Percent	80.9		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.06 J		su	1	04/03/19 21:54	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-D19A	Date Sampled: 03/29/19
Lab Sample ID: JC85448-9	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.63 UJ	0.63	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	04/03/19 21:36	EB	ASTM D1498-76M
Solids, Percent	63		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.25 J		su	1	04/03/19 21:57	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E19	Date Sampled: 03/29/19
Lab Sample ID: JC85448-10	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ	0.52	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	323		mv	1	04/03/19 21:48	EB	ASTM D1498-76M
Solids, Percent	77.2		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.28 J		su	1	04/03/19 22:05	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E20	Date Sampled: 03/29/19
Lab Sample ID: JC85448-11	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 51.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J	0.77	mg/kg	1	04/04/19 12:32	RI	SW846 3060A/7196A
Redox Potential Vs H2	321		mv	1	04/03/19 21:54	EB	ASTM D1498-76M
Solids, Percent	51.7		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.58 J		su	1	04/03/19 22:11	EB	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: CS-E20	Date Sampled: 03/29/19
Lab Sample ID: JC85448-12	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 57.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.70 UJ	0.70	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	321		mv	1	04/03/19 21:58	EB	ASTM D1498-76M
Solids, Percent	57.2		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	6.85 J		su	1	04/03/19 22:16	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-FS-01	Date Sampled: 03/29/19
Lab Sample ID: JC85448-13	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ	0.42	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	04/03/19 22:05	EB	ASTM D1498-76M
Solids, Percent	96.1		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	8.03 J		su	1	04/03/19 22:38	EB	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-FS-02	Date Sampled: 03/29/19
Lab Sample ID: JC85448-14	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 97.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41 UJ	0.41	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	04/03/19 22:11	EB	ASTM D1498-76M
Solids, Percent	97.1		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	7.67 J		su	1	04/03/19 22:46	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-FS-03	Date Sampled: 03/29/19
Lab Sample ID: JC85448-15	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ	0.42	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	04/03/19 22:16	EB	ASTM D1498-76M
Solids, Percent	96		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	8.11 J		su	1	04/03/19 23:01	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-FS-04	Date Sampled: 03/29/19
Lab Sample ID: JC85448-16	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ	0.42	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	04/03/19 22:32	EB	ASTM D1498-76M
Solids, Percent	96		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	7.99 J		su	1	04/03/19 23:09	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-FS-01	Date Sampled: 03/29/19
Lab Sample ID: JC85448-17	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41 UJ	0.41	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	04/03/19 22:37	EB	ASTM D1498-76M
Solids, Percent	96.5		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	8.04 J		su	1	04/03/19 23:18	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-FS-02	Date Sampled: 03/29/19
Lab Sample ID: JC85448-18	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ	0.42	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	329		mv	1	04/03/19 21:23	EB	ASTM D1498-76M
Solids, Percent	96		%	1	03/31/19 11:33	BG	SM2540 G 18TH ED MOD
pH	7.71 J		su	1	04/03/19 21:30	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190329)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-1A	Date Received: 03/29/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	< 200	200	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Antimony	< 6.0	6.0	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Arsenic	< 3.0	3.0	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Barium	< 200	200	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Beryllium	< 1.0	1.0	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Cadmium	< 3.0	3.0	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Calcium	< 5000	5000	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Chromium	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Cobalt	< 50	50	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Copper	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Iron	< 100	100	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Lead	< 3.0	3.0	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Magnesium	< 5000	5000	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Manganese	< 15	15	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Mercury	< 0.20	0.20	ug/l	1	04/01/19	04/01/19	LL SW846 7470A ¹	SW846 7470A ⁴
Nickel	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Potassium	< 10000	10000	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Selenium	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Silver	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Sodium	< 10000	10000	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Thallium	< 10	10	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Vanadium	< 50	50	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³
Zinc	< 20	20	ug/l	1	04/01/19	04/01/19	ND SW846 6010D ²	SW846 3010A ³

(1) Instrument QC Batch: MA46394

(2) Instrument QC Batch: MA46401

(3) Prep QC Batch: MP13712

(4) Prep QC Batch: MP13749

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A57(0.0-0.5) Lab Sample ID: JC85448-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: 85.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.5	4.5	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium ^a	492	2.2	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	27.8	4.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.2	2.2	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	61.1	5.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A57(0.0-0.5)		Date Sampled: 03/29/19
Lab Sample ID: JC85448-2A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	446	3.1	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A57(2.0-2.5) Lab Sample ID: JC85448-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: 87.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	45.0	1.1	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.9	4.4	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	5.5	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A57(2.0-2.5)		Date Sampled: 03/29/19
Lab Sample ID: JC85448-3A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	44.5	1.6	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A57(4.0-4.5)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-4A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.2	1.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.5	4.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.1	5.8	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A57(4.0-4.5)		Date Sampled: 03/29/19
Lab Sample ID: JC85448-4A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 86.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.7	1.7	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A57(5.5-6.0) Lab Sample ID: JC85448-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: 81.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	13.4	1.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	4.8	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	18.8	6.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A57(5.5-6.0)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-5A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 81.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.9	1.7	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K5	Date Sampled: 03/29/19
Lab Sample ID: JC85448-6A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	26.7	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.2	4.7	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.1	5.9	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K5	Date Sampled: 03/29/19
Lab Sample ID: JC85448-6A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.5	1.7	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I5A		Date Sampled: 03/29/19
Lab Sample ID: JC85448-7A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.7	1.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.0	4.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.2	5.7	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-I5A		Date Sampled: 03/29/19
Lab Sample ID: JC85448-7A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.3	1.6	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-23(20190329) Lab Sample ID: JC85448-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: 80.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.6	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	4.9	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.3	6.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-23(20190329)	Date Sampled: 03/29/19
Lab Sample ID: JC85448-8A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.6	1.7	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D19A	Date Sampled: 03/29/19
Lab Sample ID: JC85448-9A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.1	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	21.6	6.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	7.7	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: BS-D19A	Date Sampled: 03/29/19
Lab Sample ID: JC85448-9A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.1	2.1	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E19		Date Sampled: 03/29/19
Lab Sample ID: JC85448-10A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	584	5.0	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.2	6.2	mg/kg	1	03/30/19	04/01/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: BS-E19	Date Sampled: 03/29/19
Lab Sample ID: JC85448-10A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.3	1.7	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E20	Date Sampled: 03/29/19
Lab Sample ID: JC85448-11A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 51.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.7	3.7	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	202	1.8	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	433	7.4	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.8	1.8	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	65.9	9.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: BS-E20	Date Sampled: 03/29/19
Lab Sample ID: JC85448-11A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 51.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	201	2.6	mg/kg	1	04/04/19 12:32	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-E20	Date Sampled: 03/29/19
Lab Sample ID: JC85448-12A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 57.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Antimony ^a	< 17	17	mg/kg	5	03/30/19	04/02/19	ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	172	8.4	mg/kg	5	03/30/19	04/02/19	ND	SW846 6010D ¹	SW846 3050B ²
Nickel	2060	34	mg/kg	5	03/30/19	04/02/19	ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 8.4	8.4	mg/kg	5	03/30/19	04/02/19	ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.8	8.4	mg/kg	1	03/30/19	04/01/19	ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46404

(2) Prep QC Batch: MP13709

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-E20		Date Sampled: 03/29/19
Lab Sample ID: JC85448-12A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 57.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	171	9.1	mg/kg	1	04/04/19 13:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: SW-FS-01		
Lab Sample ID: JC85448-13A		Date Sampled: 03/29/19
Matrix: SO - Soil		Date Received: 03/29/19
Method: SW846 8270D SW846 3546		Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111386.D	1	04/02/19 13:50	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	68	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	68	22	ug/kg	
	3&4-Methylphenol	ND	68	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND UJ	340	90	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	140	32	ug/kg	
108-95-2	Phenol	ND	68	18	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND UJ	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND UJ	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND UJ	34	12	ug/kg	
208-96-8	Acenaphthylene	ND UJ	34	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.3	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	68	14	ug/kg	
56-55-3	Benzo(a)anthracene	12.2	34	9.6	ug/kg	J
50-32-8	Benzo(a)pyrene	ND UJ	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND UJ	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND UJ	34	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND UJ	68	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^b	ND UJ	68	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	68	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.4	ug/kg	
91-58-7	2-Chloronaphthalene	ND UJ	68	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	68	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SW-FS-01	Date Sampled:	03/29/19
Lab Sample ID:	JC85448-13A	Date Received:	03/29/19
Matrix:	SO - Soil	Percent Solids:	96.1
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	68	13	ug/kg	
218-01-9	Chrysene	ND UJ	34	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND UJ	68	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND UJ	68	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	68	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND UJ	68	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND UJ	34	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND UJ	34	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	68	28	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	34	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND UJ	34	15	ug/kg	
132-64-9	Dibenzofuran	ND	68	14	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	68	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND UJ	68	8.4	ug/kg	
84-66-2	Diethyl phthalate	ND UJ	68	7.2	ug/kg	
131-11-3	Dimethyl phthalate	ND UJ	68	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	68	7.9	ug/kg	
206-44-0	Fluoranthene	ND	34	15	ug/kg	
86-73-7	Fluorene	ND UJ	34	16	ug/kg	
118-74-1	Hexachlorobenzene	ND UJ	68	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND UJ	34	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	340	13	ug/kg	
67-72-1	Hexachloroethane	ND UJ	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	37.9 J	34	16	ug/kg	
78-59-1	Isophorone	ND UJ	68	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	34	7.6	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	170	8.0	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.8	ug/kg	
91-20-3	Naphthalene	ND UJ	34	9.5	ug/kg	
98-95-3	Nitrobenzene	ND UJ	68	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND UJ	68	9.8	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND UJ	170	12	ug/kg	
85-01-8	Phenanthrene	ND	34	11	ug/kg	
129-00-0	Pyrene	14.3	34	11	ug/kg	J
95-94-3	1,2,4,5-Tetrachlorobenzene	ND UJ	170	8.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	57%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

3.1
3

Client Sample ID: SW-FS-01		Date Sampled: 03/29/19
Lab Sample ID: JC85448-13A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.1
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	60%		27-114%
118-79-6	2,4,6-Tribromophenol	68%		19-152%
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.63	1400	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-01	Date Sampled: 03/29/19
Lab Sample ID: JC85448-13A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	5890	53	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.1	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.1	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	35.4	21	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	< 0.42	0.42	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.53	0.53	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	3750	530	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	20.0	1.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	7.6	5.3	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Copper	39.7	2.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	14700	53	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	< 2.1	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	5040	530	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	112	1.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.034	0.034	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	14.4	4.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	3540	1100	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.53	0.53	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 1100	1100	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.1	2.1	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	26.2	5.3	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	16.5	5.3	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: SW-FS-02		
Lab Sample ID: JC85448-14A		Date Sampled: 03/29/19
Matrix: SO - Soil		Date Received: 03/29/19
Method: SW846 8270D SW846 3546		Percent Solids: 97.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111379.D	1	04/02/19 10:29	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	68	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	61	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	68	22	ug/kg	
	3&4-Methylphenol	ND	68	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	340	91	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	140	32	ug/kg	
108-95-2	Phenol	ND	68	18	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	23	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	ND	34	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.3	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	68	15	ug/kg	
56-55-3	Benzo(a)anthracene	ND	34	9.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	34	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	68	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^c	13.7	68	8.3	ug/kg	J
92-52-4	1,1'-Biphenyl	ND	68	4.7	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.4	ug/kg	
91-58-7	2-Chloronaphthalene	ND	68	8.1	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	68	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-02		Date Sampled: 03/29/19
Lab Sample ID: JC85448-14A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 97.1
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	68	13	ug/kg	
218-01-9	Chrysene	ND	34	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	68	7.3	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	68	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	68	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	68	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	34	11	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	34	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	68	28	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	34	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	34	15	ug/kg	
132-64-9	Dibenzofuran	ND	68	14	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	68	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	68	8.5	ug/kg	
84-66-2	Diethyl phthalate	ND	68	7.2	ug/kg	
131-11-3	Dimethyl phthalate	ND	68	6.1	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	68	8.0	ug/kg	
206-44-0	Fluoranthene	ND	34	15	ug/kg	
86-73-7	Fluorene	ND	34	16	ug/kg	
118-74-1	Hexachlorobenzene	ND	68	8.6	ug/kg	
87-68-3	Hexachlorobutadiene	ND	34	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	340	14	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	34.0	34	16	ug/kg	
78-59-1	Isophorone	ND	68	7.3	ug/kg	
91-57-6	2-Methylnaphthalene	ND	34	7.7	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	170	8.0	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.5	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.8	ug/kg	
91-20-3	Naphthalene	ND	34	9.6	ug/kg	
98-95-3	Nitrobenzene	ND	68	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	68	9.8	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	34	11	ug/kg	
129-00-0	Pyrene	13.5	34	11	ug/kg	J
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		23-115%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

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3

Client Sample ID: SW-FS-02		Date Sampled: 03/29/19
Lab Sample ID: JC85448-14A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 97.1
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	67%		27-114%
118-79-6	2,4,6-Tribromophenol	74%		19-152%
4165-60-0	Nitrobenzene-d5	81%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	87%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.64	1500	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.
- (c) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

32
3

Client Sample ID: SW-FS-02		Date Sampled: 03/29/19
Lab Sample ID: JC85448-14A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 97.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	7640	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony ^a	< 4.0	4.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	2.1	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	49.8	20	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	< 0.40	0.40	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	3640	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	26.4	0.99	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt ^a	15.3	9.9	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Copper	54.0	2.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	17600	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	2.4	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	7740	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	128	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.028	0.028	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	19.9	4.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	5340	990	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 990	990	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.0	2.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	33.2	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	15.9	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

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Report of Analysis

Page 1 of 3

Client Sample ID: SW-FS-03		
Lab Sample ID: JC85448-15A		Date Sampled: 03/29/19
Matrix: SO - Soil		Date Received: 03/29/19
Method: SW846 8270D SW846 3546		Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111383.D	1	04/02/19 12:10	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	31.5 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	32.3	33	9.4	ug/kg	J
50-32-8	Benzo(a)pyrene	36.0	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	39.9	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	25.5	33	17	ug/kg	J
207-08-9	Benzo(k)fluoranthene	17.6	33	15	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^c	18.2	66	8.1	ug/kg	J
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-03		Date Sampled: 03/29/19
Lab Sample ID: JC85448-15A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	66	13	ug/kg	
218-01-9	Chrysene	34.5	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	66	28	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	66	7.7	ug/kg	
206-44-0	Fluoranthene	50.4	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	51.9	33	16	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	170	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	14.8	33	11	ug/kg	J
129-00-0	Pyrene	48.7	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	60%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-03 Lab Sample ID: JC85448-15A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 03/29/19 Date Received: 03/29/19 Percent Solids: 96.0
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	62%		27-114%
118-79-6	2,4,6-Tribromophenol	73%		19-152%
4165-60-0	Nitrobenzene-d5	76%		26-134%
321-60-8	2-Fluorobiphenyl	66%		39-124%
1718-51-0	Terphenyl-d14	82%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.64	410	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.
- (c) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

33
3

Client Sample ID: SW-FS-03		Date Sampled: 03/29/19
Lab Sample ID: JC85448-15A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	7800	51	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony ^a	< 4.0	4.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	4.6	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	68.1	20	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	0.42	0.40	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.51	0.51	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	4230	510	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	32.8	1.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt ^a	13.7	10	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Copper	44.0	2.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	17200	51	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	3.4	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	7960	510	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	124	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	27.8	4.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	5490	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.51	0.51	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 1000	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.0	2.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	36.7	5.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	21.6	5.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: SW-FS-04		Date Sampled: 03/29/19
Lab Sample ID: JC85448-16A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111385.D	1	04/02/19 13:25	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	69	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	61	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	37	ug/kg	
95-48-7	2-Methylphenol	ND	69	22	ug/kg	
	3&4-Methylphenol	ND	69	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	23	ug/kg	
100-02-7	4-Nitrophenol	ND	340	91	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	140	32	ug/kg	
108-95-2	Phenol	ND	69	18	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	23	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	26	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	ND	34	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.4	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	69	15	ug/kg	
56-55-3	Benzo(a)anthracene	38.5	34	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	39.7	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	49.4	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	30.2	34	17	ug/kg	J
207-08-9	Benzo(k)fluoranthene	20.0	34	16	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	69	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^c	27.1	69	8.4	ug/kg	J
92-52-4	1,1'-Biphenyl	ND	69	4.7	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.5	ug/kg	
91-58-7	2-Chloronaphthalene	ND	69	8.2	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	69	5.0	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-04		Date Sampled: 03/29/19
Lab Sample ID: JC85448-16A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	69	14	ug/kg	
218-01-9	Chrysene	37.5	34	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	69	7.3	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	69	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	69	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	69	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	34	11	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	34	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	69	29	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	34	23	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	34	15	ug/kg	
132-64-9	Dibenzofuran	ND	69	14	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	69	5.6	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	69	8.5	ug/kg	
84-66-2	Diethyl phthalate	ND	69	7.3	ug/kg	
131-11-3	Dimethyl phthalate	ND	69	6.1	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	69	8.0	ug/kg	
206-44-0	Fluoranthene	58.8	34	15	ug/kg	
86-73-7	Fluorene	ND	34	16	ug/kg	
118-74-1	Hexachlorobenzene	ND	69	8.7	ug/kg	
87-68-3	Hexachlorobutadiene	ND	34	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	340	14	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	56.4	34	16	ug/kg	
78-59-1	Isophorone	ND	69	7.3	ug/kg	
91-57-6	2-Methylnaphthalene	ND	34	7.7	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	170	8.1	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.6	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.9	ug/kg	
91-20-3	Naphthalene	ND	34	9.7	ug/kg	
98-95-3	Nitrobenzene	ND	69	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	69	9.9	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	13	ug/kg	
85-01-8	Phenanthrene	16.3	34	12	ug/kg	J
129-00-0	Pyrene	58.1	34	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-04		Date Sampled: 03/29/19
Lab Sample ID: JC85448-16A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	65%		27-114%
118-79-6	2,4,6-Tribromophenol	77%		19-152%
4165-60-0	Nitrobenzene-d5	80%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	90%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.64	370	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.
- (c) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: SW-FS-04		Date Sampled: 03/29/19
Lab Sample ID: JC85448-16A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	7430	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony ^a	< 4.0	4.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	51.1	20	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	0.42	0.40	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	3430	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	31.5	0.99	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt ^a	10.7	9.9	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Copper	29.0	2.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	16000	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	3.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	7820	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	116	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.034	0.034	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	18.0	4.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	5470	990	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 990	990	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.0	2.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	32.4	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	16.1	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

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Report of Analysis

Page 1 of 3

Client Sample ID:	BS-FS-01	Date Sampled:	03/29/19
Lab Sample ID:	JC85448-17A	Date Received:	03/29/19
Matrix:	SO - Soil	Percent Solids:	96.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111380.D	1	04/02/19 10:54	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	31.5 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^b	ND UJ	66	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BS-FS-01	Date Sampled:	03/29/19
Lab Sample ID:	JC85448-17A	Date Received:	03/29/19
Matrix:	SO - Soil	Percent Solids:	96.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.0	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	66	27	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	66	7.0	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.4	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	160	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.5	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	57%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

3.5
3

Client Sample ID: BS-FS-01		Date Sampled: 03/29/19
Lab Sample ID: JC85448-17A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	60%		27-114%
118-79-6	2,4,6-Tribromophenol	68%		19-152%
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	78%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.64	950	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: BS-FS-01	Date Sampled: 03/29/19
Lab Sample ID: JC85448-17A	Date Received: 03/29/19
Matrix: SO - Soil	Percent Solids: 96.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	7570	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony ^a	< 4.0	4.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	52.6	20	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	< 0.40	0.40	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	4230	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	38.0	1.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt ^a	13.0	10	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Copper	52.1	2.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	17000	50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	8650	500	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	113	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.035	0.035	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	25.0	4.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	5890	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 1000	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.0	2.0	mg/kg	2	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	38.9	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	14.9	5.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: BS-FS-02		Date Sampled: 03/29/19
Lab Sample ID: JC85448-18A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M111381.D	1	04/02/19 11:19	CC	04/01/19 17:55	OP19474	E2M4944
Run #2							

Run #	Initial Weight	Final Volume
Run #1	31.5 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol ^a	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine ^b	ND UJ	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate ^b	ND UJ	66	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BS-FS-02	Date Sampled:	03/29/19
Lab Sample ID:	JC85448-18A	Date Received:	03/29/19
Matrix:	SO - Soil	Percent Solids:	96.0
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam ^b	ND UJ	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane) ^b	ND UJ	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine ^b	ND UJ	66	28	ug/kg	
123-91-1	1,4-Dioxane ^a	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate ^b	ND UJ	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate ^b	ND UJ	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline ^b	ND UJ	170	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	58%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

3.6
3

Client Sample ID: BS-FS-02		Date Sampled: 03/29/19
Lab Sample ID: JC85448-18A		Date Received: 03/29/19
Matrix: SO - Soil		Percent Solids: 96.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	65%		27-114%
118-79-6	2,4,6-Tribromophenol	68%		19-152%
4165-60-0	Nitrobenzene-d5	77%		26-134%
321-60-8	2-Fluorobiphenyl	67%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.63	1500	ug/kg	J R
544-50-0	Cyclic octaatomic sulfur	11.27	160	ug/kg	JN
	Total TIC, Semi-Volatile		160	ug/kg	J

- (a) Associated CCV outside of control limits low. Low level standard analyzed to demonstrate system suitability to detect affected analytes.
- (b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BS-FS-02	Date Sampled:	03/29/19
Lab Sample ID:	JC85448-18A	Date Received:	03/29/19
Matrix:	SO - Soil	Percent Solids:	96.0
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	8950	52	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Antimony ^a	< 6.2	6.2	mg/kg	3	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	4.5	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Barium	56.1	21	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium ^a	< 0.62	0.62	mg/kg	3	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.52	0.52	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	3960	520	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	31.0	1.0	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt ^a	19.0	15	mg/kg	3	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Copper	70.4	2.6	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Iron	20500	52	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Lead	3.2	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	9200	520	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	150	1.5	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/01/19	04/01/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	23.0	4.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	6410	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.52	0.52	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	< 1000	1000	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 3.1	3.1	mg/kg	3	03/30/19	04/02/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	39.3	5.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	21.0	5.2	mg/kg	1	03/30/19	04/01/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46397

(2) Instrument QC Batch: MA46404

(3) Prep QC Batch: MP13709

(4) Prep QC Batch: MP13740

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC85589, JC85679, JC85861, and JC85965

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33484R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0001.00020

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC85589, JC85679, JC85861, and JC85965 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC85589	FB(20190402)	JC85589-1	Water	4/2/2019		X	X	X
	BS-J6	JC85589-2	Soil	4/2/2019		X	X	X
	BS-K6	JC85589-3	Soil	4/2/2019		X	X	X
	BS-I6A	JC85589-4	Soil	4/2/2019		X	X	X
JC85679	FB(20190403)	JC85679-1	Water	4/3/2019		X	X	X
	BS-G17	JC85679-2	Soil	4/3/2019		X	X	X
JC85861	FB(20190405)	JC85861-1	Water	4/5/2019		X	X	X
	BS-H17	JC85861-2	Soil	4/5/2019		X	X	X
	BS-K5T	JC85861-3	Soil	4/5/2019		X	X	X
	BS-J6T	JC85861-4	Soil	4/5/2019		X	X	X
JC85965	FB(20190408)	JC85965-1	Water	4/8/2019		X	X	X
	BS-I7A	JC85965-2	Soil	4/8/2019		X	X	X
	BS-J7	JC85965-3	Soil	4/8/2019		X	X	X
	BS-K7	JC85965-4	Soil	4/8/2019		X	X	X
	BS-J7T	JC85965-5	Soil	4/8/2019		X	X	X
	BS-K7T	JC85965-6	Soil	4/8/2019		X	X	X
	BS-K6T	JC85965-7	Soil	4/8/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDG #JC85861: Miscellaneous parameters for sample BS-H17 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC85679 and JC85861: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC85589 and JC85965: The MS/MSD analysis performed on sample locations BS-J6 and BS-I7A exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-J6	Antimony	71.5%	71.6%
BS-I7A	Antimony	67.7%	68.3%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

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matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC85589 and JC85965: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-J6 and BS-I7A. The MS/MSD recoveries exhibited acceptable RPDs.

SDGs #JC85679 and JC85861: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC85589 and JC85965: The serial dilution analysis performed using samples BS-J6 and BS-I7A exhibited %D within the control limits.

SDGs #JC85679 and JC85861: The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC85589, JC85679, and JC85965: The MS analysis was not performed using a sample from these SDGs.

SDG #JC85861: The MS analysis performed on sample location BS-H17 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H17	Hexavalent Chromium, Insoluble	< 50%	69.5%
	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDG #JC85861: The reanalyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC85589, JC85679, and JC85965: The PDS analysis was not performed using a sample from these SDGs.

SDG #JC85861: The PDS analysis performed on sample location BS-H17 exhibited a recovery outside of the control limits as presented in the table below.

DATA REVIEW REPORT

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-H17	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC85589, JC85679, and JC85965: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC85861: The laboratory duplicate analysis performed on sample locations BS-H17 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery
 RPD Relative percent difference
 %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190405)	SM4500H+B	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-H17 BS-K5T BS-J6T	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
BS-H17	ASTM D3872-86	Analysis: 21 days	< 24 hours from collection
BS-H17	SM4500S2-A	Analysis: 21 days	< 7 days from collection
BS-H17	Lloyd Kahn	Analysis: 20 days	< 14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC85589, JC85679, and JC85965: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC85861: The laboratory duplicate analysis performed on sample location BS-H17 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 17, 2019

PEER REVIEW: Dennis Capria

DATE: August 13, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #
SGS Guide #
Box #
SGS Job #

011719-199
JC85589

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes									
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Hexavalent Chromium Total Chromium Trivalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LQ - Other Liquid AR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinsate Blank TB - Trip Blank									
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																													
City: Newton PA		City: Jersey City NJ										Billing Information (if different from Report to)										LAB USE ONLY A30 G41									
Project Contact: Kristin Mastrocola		Project #: NP000770.0003										Company Name																			
Phone #		Client Purchase Order #										Street Address										City State Zip									
Sample(s) Name(s): Christina C. Gill: 201.264.8800		Project Manager: Jim McLevyllan										Attention																			
Field ID / Point of Collection		Collection										Number of preserved Bottles										HCl NaOH HNO ₃ H ₂ O ₂ NONE ED Water MICH EDC/ONE									
MECH/EDI Vial #		Date										Time																			
1 FB (20190402)		4/2/19										0730										CC FB FB 2									
2 BS-J6		4/2/19										0830										CC FB SO 1									
3 BS-K6		4/2/19										0845										CC FB SO 1									
4 BS-I6A		4/2/19										0900										CC FB SO 1									
Turn Around Time (Business Days)		Approved By (SGS PM) / Date:										Deliverable										Comments / Special Instructions									
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQS										<input type="checkbox"/> DOD-QSMS									
All data available via LaLink		Approval needed for 1-3 Business Day TAT										Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions									
Sample Custody must be documented below each time samples change possession, including courier delivery.																															
Relinquished by: OC		Date / Time: 4/2/19 1400		Received By: Robert Chambers		Date / Time: 4/2/19 1601		Received By: [Signature]		Relinquished by: 2 Robert Chambers		Date / Time: 4/2/19 1601		Received By: [Signature]		Relinquished by: 3		Date / Time: 3		Received By: 4											
Relinquished by: 5		Date / Time: 5		Received By: 5		Date / Time: 5		Received By: 5		Relinquished by: 4		Date / Time: 4		Received By: 4		Relinquished by: 4		Date / Time: 4		Received By: 4											
Contody Seal # 11674 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact																															
Preserved where applicable <input type="checkbox"/> Present <input checked="" type="checkbox"/> Absent																															
On Ice <input checked="" type="checkbox"/> Cooler Temp. °C 3.2																															

5.2
5

E

INITIAL ASSESSMENT **JRZB**
VERIFICATION

EHSQA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190402)	Date Sampled: 04/02/19
Lab Sample ID: JC85589-1	Date Received: 04/02/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/02/19 22:30	MO	SW846 7196A
Redox Potential Vs H2	673		mv	1	04/04/19 17:22	EB	ASTM D1498-76
pH ^a	5.98		su	1	04/02/19 17:02	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J6	Date Sampled: 04/02/19
Lab Sample ID: JC85589-2	Date Received: 04/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	294		mv	1	04/03/19 20:57	EB	ASTM D1498-76M
Solids, Percent	80.7		%	1	04/03/19 16:42	BG	SM2540 G 18TH ED MOD
pH	6.75		su	1	04/03/19 20:55	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K6	Date Sampled: 04/02/19
Lab Sample ID: JC85589-3	Date Received: 04/02/19
Matrix: SO - Soil	Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	299		mv	1	04/03/19 20:59	EB	ASTM D1498-76M
Solids, Percent	80.8		%	1	04/03/19 16:42	BG	SM2540 G 18TH ED MOD
pH	6.56		su	1	04/03/19 20:56	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I6A	Date Sampled: 04/02/19
Lab Sample ID: JC85589-4	Date Received: 04/02/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.45	mg/kg	1	04/04/19 13:14	RI	SW846 3060A/7196A
Redox Potential Vs H2	313		mv	1	04/03/19 21:05	EB	ASTM D1498-76M
Solids, Percent	88.9		%	1	04/03/19 16:42	BG	SM2540 G 18TH ED MOD
pH	6.33		su	1	04/03/19 21:04	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190402)		Date Sampled: 04/02/19
Lab Sample ID: JC85589-1A		Date Received: 04/02/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/02/19	04/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/02/19	04/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/02/19	04/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/02/19	04/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/02/19	04/03/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46419

(2) Prep QC Batch: MP13765

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190402)	Date Sampled: 04/02/19
Lab Sample ID: JC85589-1A	Date Received: 04/02/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/03/19 13:26	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J6	Date Sampled: 04/02/19
Lab Sample ID: JC85589-2A	Date Received: 04/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	8.4	1.3	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	5.0	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	12.1	6.3	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46422

(2) Prep QC Batch: MP13784

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J6		Date Sampled: 04/02/19
Lab Sample ID: JC85589-2A		Date Received: 04/02/19
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.4	1.8	mg/kg	1	04/04/19 13:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K6		Date Sampled: 04/02/19
Lab Sample ID: JC85589-3A		Date Received: 04/02/19
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	21.7	1.2	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ³
Nickel	15.9	4.8	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.4	2.4	mg/kg	2	04/03/19	04/04/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	30.7	6.0	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ³

(1) Instrument QC Batch: MA46422

(2) Instrument QC Batch: MA46432

(3) Prep QC Batch: MP13784

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K6		Date Sampled: 04/02/19
Lab Sample ID: JC85589-3A		Date Received: 04/02/19
Matrix: SO - Soil		Percent Solids: 80.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.7	mg/kg	1	04/04/19 13:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I6A		Date Sampled: 04/02/19
Lab Sample ID: JC85589-4A		Date Received: 04/02/19
Matrix: SO - Soil		Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	20.5	1.1	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	12.8	4.5	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.4	5.6	mg/kg	1	04/03/19	04/03/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46422

(2) Prep QC Batch: MP13784

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I6A	Date Sampled: 04/02/19
Lab Sample ID: JC85589-4A	Date Received: 04/02/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.4	1.6	mg/kg	1	04/04/19 13:14	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



50 FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsus

FED-EX Tracking #
SGS Quote #
Bottle Label Control # **AN-03519-108**
SGS Job # **JC85679**

Client / Reporting Information		Project Information										Requested Analysis										Matrix Codes
Company Name: Accade		Project Name: PPG Jersey City Site 107										TOTAL Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																				
City: Newtown PA 18940		City: Jersey City NJ																				
Project Contact: Krista Mastrosola		Project #: NP000770.0003																				
Phone #: 610.755.7080		Client Purchase Order #										Billing Information (if different from Report to)										LAB USE ONLY
Sampler(s) Name(s): Christa C. Felle		Project Manager: Jim McLaughlin, Jr.										Number of preserved bottles										A38
Field ID / Point of Collection		MECH/ID / Vial #										Matrix										945
1 FB (200403)		4/3/19 1200										CC G FB 2										D30
2 BS-617		4/3/19 1330										CC G SO 1										
BS-1110		4/3/19										G SO 1										
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions										
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDVLS										INITIAL ASSESSMENT L.B. ZB LABEL VERIFICATION
<input type="checkbox"/> All data available via Lablink * Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions										
Relinquished by: [Signature]		Date / Time: 4/3/19 1400										Relinquished by: Robert Schaubert										Date / Time: 4-3-19 1532
Relinquished by: [Signature]		Date / Time:										Relinquished by: [Signature]										Date / Time:
Relinquished by: [Signature]		Date / Time:										Relinquished by: [Signature]										Date / Time:
Relinquished by: [Signature]		Date / Time:										Relinquished by: [Signature]										Date / Time:
Custody Seal # 14264		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact										<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent										On Ice <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
																						Cooler Temp: 3.2°C

5.2
5

E



Report of Analysis

Client Sample ID: FB(20190403) Lab Sample ID: JC85679-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/03/19 Date Received: 04/03/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/03/19 22:15	JO	SW846 7196A
Redox Potential Vs H2	631		mv	1	04/04/19 17:25	EB	ASTM D1498-76
pH ^a	5.89		su	1	04/03/19 17:27	FR	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G17	Date Sampled: 04/03/19
Lab Sample ID: JC85679-2	Date Received: 04/03/19
Matrix: SO - Soil	Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.61	0.61	mg/kg	1	04/05/19 12:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	233		mv	1	04/04/19 19:52	EB	ASTM D1498-76M
Solids, Percent	65.6		%	1	04/04/19 16:16	BG	SM2540 G 18TH ED MOD
pH	6.56		su	1	04/04/19 19:51	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G17	Date Sampled: 04/03/19
Lab Sample ID: JC85679-2R	Date Received: 04/03/19
Matrix: SO - Soil	Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.94	0.61	mg/kg	1	04/17/19 16:18	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190403)		Date Sampled: 04/03/19
Lab Sample ID: JC85679-1A		Date Received: 04/03/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/04/19	04/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/04/19	04/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/04/19	04/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/04/19	04/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/04/19	04/05/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46439

(2) Prep QC Batch: MP13811

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190403)		Date Sampled: 04/03/19
Lab Sample ID: JC85679-1A		Date Received: 04/03/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/05/19 12:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G17		Date Sampled: 04/03/19
Lab Sample ID: JC85679-2A		Date Received: 04/03/19
Matrix: SO - Soil		Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	04/04/19	04/04/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.6	1.5	mg/kg	1	04/04/19	04/04/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	12.5	6.2	mg/kg	1	04/04/19	04/04/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	04/04/19	04/04/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	28.8	7.7	mg/kg	1	04/04/19	04/04/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46434

(2) Prep QC Batch: MP13810

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G17	Date Sampled: 04/03/19
Lab Sample ID: JC85679-2A	Date Received: 04/03/19
Matrix: SO - Soil	Percent Solids: 65.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	2.1	mg/kg	1	04/05/19 12:43	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

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SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsus

E

FED-EX Tracking #
SGS Quote #
Bottle Control #
SGS Job #
AK-03519-108
JC85861

Client / Reporting Information		Project Information										Requested Analysis								Matrix Codes		
Company Name: <u>Accardi</u>		Project Name: <u>PPA Jersey City Site 167</u>										Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium								DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank ES - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address: <u>10 Frontalane</u>		Street: <u>18 Chapel Ave.</u>																				
City: <u>Newton PA 18940</u>		City: <u>Jersey City NJ</u>																				
Project Contact: <u>Krista Maszkova</u>		Project #: <u>NP005770 3.8</u>																				
Phone #: <u>610.755.7080</u>		Client Purchase Order #																				
Sample(s) Name(s): <u>Christina Cifelli</u>		Project Manager: <u>Sam McLaughlin, Jr.</u>																				
SGS Sample #	Field ID / Point of Collection	MEQ/VI Viol #	Date	Time	Sampled by	Dist (G) (Line/C)	Matrix	# of bottles	HC	Ni/PH	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ	LAB USE ONLY	
1	<u>FB (20150405)</u>		<u>4/5/19</u>	<u>1100</u>	<u>CC</u>	<u>G</u>	<u>FB</u>	<u>2</u>													<u>A36</u>	
2	<u>RS- H17</u>		<u>4/5/19</u>	<u>1130</u>	<u>CC</u>	<u>G</u>	<u>SO</u>	<u>1</u>													<u>B4</u>	
-	<u>BB- I17</u>		<u>4/5/19</u>	<u>1145</u>	<u>CC</u>	<u>G</u>	<u>SO</u>	<u>1</u>													<u>D36</u>	
3	<u>RS- K5T</u>		<u>4/5/19</u>	<u>1245</u>	<u>CC</u>	<u>G</u>	<u>SO</u>	<u>1</u>													<u>D36</u>	
4	<u>RS- I6T</u>		<u>4/5/19</u>	<u>1400</u>	<u>CC</u>	<u>G</u>	<u>SO</u>	<u>1</u>														
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions										
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <u>Eqm</u>								<input type="checkbox"/> DOD-QSMS	INITIAL ASSESSMENT <u>LR 3B</u> LABEL VERIFICATION	
All data available via Lablink		Approval needed for 1-3 Business Day TAT										Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Res. data http://www.sgs.com/en/terms-and-conditions										
Relinquished by: <u>cc Cifelli</u>		Date / Time: <u>4/5/19 1420</u>										Relinquished by: <u>T. Schwan</u>								Date / Time: <u>4/5/19 230</u>		
Relinquished by: <u>3</u>		Date / Time: <u>3</u>										Relinquished by: <u>4</u>								Date / Time: <u>16:30</u>		
Relinquished by: <u>5</u>		Date / Time: <u>5</u>										Custody Seal # <u>11233</u>								<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent <input type="checkbox"/> Therm. ID <input checked="" type="checkbox"/> Cooler Temp. °C		

5.2
5

CIP
3.1

EHS-QAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: FB(20190405)		Date Sampled: 04/05/19
Lab Sample ID: JC85861-1		Date Received: 04/05/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/05/19 22:50	JO	SW846 7196A
Redox Potential Vs H2	485		mv	1	04/08/19 23:14	EB	ASTM D1498-76
pH ^a	6.83 J		su	1	04/08/19 15:38	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H17	Date Sampled: 04/05/19
Lab Sample ID: JC85861-2	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.60	0.60	mg/kg	1	04/09/19 19:32	JOO	SW846 3060A/7196A
Redox Potential Vs H2	318		mv	1	04/09/19 22:09	EB	ASTM D1498-76M
Solids, Percent	66.5		%	1	04/07/19 15:20	BG	SM2540 G 18TH ED MOD
pH	6.77 J		su	1	04/09/19 22:09	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K5T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-3	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	338		mv	1	04/09/19 22:13	EB	ASTM D1498-76M
Solids, Percent	79.8		%	1	04/07/19 15:20	BG	SM2540 G 18TH ED MOD
pH	7.10 J		su	1	04/09/19 22:13	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J6T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-4	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	386		mv	1	04/09/19 22:22	EB	ASTM D1498-76M
Solids, Percent	84.3		%	1	04/07/19 15:20	BG	SM2540 G 18TH ED MOD
pH	6.98 J		su	1	04/09/19 22:23	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H17	Date Sampled: 04/05/19
Lab Sample ID: JC85861-2R	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.60 UJ-	0.60	mg/kg	1	04/20/19 13:55	JOO	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H17	Date Sampled: 04/05/19
Lab Sample ID: JC85861-2RT	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	04/26/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	04/26/19 09:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	36400 J	150	mg/kg	1	04/25/19 12:35	CD	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K5T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-3R	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52 J-	0.50	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J6T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-4R	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190405) Lab Sample ID: JC85861-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/05/19 Date Received: 04/05/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/08/19	04/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/08/19	04/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/08/19	04/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/08/19	04/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/08/19	04/08/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46457

(2) Prep QC Batch: MP13939

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190405)	Date Sampled: 04/05/19
Lab Sample ID: JC85861-1A	Date Received: 04/05/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/08/19 21:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H17		Date Sampled: 04/05/19
Lab Sample ID: JC85861-2A		Date Received: 04/05/19
Matrix: SO - Soil		Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.6	1.4	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.9	5.7	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.9	7.2	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46455

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H17	Date Sampled: 04/05/19
Lab Sample ID: JC85861-2A	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 66.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.6	2.0	mg/kg	1	04/09/19 19:32	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K5T		Date Sampled: 04/05/19
Lab Sample ID: JC85861-3A		Date Received: 04/05/19
Matrix: SO - Soil		Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	9.5	1.3	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.3	5.2	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	12.4	6.5	mg/kg	1	04/05/19	04/08/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46455

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K5T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-3A	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.5 9.0	1.8	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J6T		Date Sampled: 04/05/19
Lab Sample ID: JC85861-4A		Date Received: 04/05/19
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	04/05/19	04/08/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.6	1.1	mg/kg	1	04/05/19	04/08/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.4	4.6	mg/kg	1	04/05/19	04/08/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	04/05/19	04/08/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.3	5.7	mg/kg	1	04/05/19	04/08/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46455

(2) Prep QC Batch: MP13519

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J6T	Date Sampled: 04/05/19
Lab Sample ID: JC85861-4A	Date Received: 04/05/19
Matrix: SO - Soil	Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.6	1.6	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC85965

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)										Matrix Codes		
Company Name: Arcadis		Project Name: PPG Jersey City Site 107				Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Vanadium Thallium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TP - Trip Blank		
Street Address: 10 Friends Lane		Street: 18 Chynel Avenue		Billing Information (if different from Report to)														
City: Newtown PA		City: Jersey City NJ		Company Name														
Project Contact: Krista Meebocala		Project #: N1000770-0003-00008		Street Address														
Phone #: 610.755.7080		Client Purchase Order #		City														
Fax #		City		State														
Zip		State		Zip														
Sampler(s) Name(s): Christina Cifelli		Phone #: 201.264.8865		Project Manager: Sim McLaughlin, Jr.		Attention:												
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles		LAB USE ONLY
1		FB(20190408)				4/8/19		0915		CC		FB		2				A36
2		BS-I7A				4/8/19		0930		CC		SO		1				G56
3		BS-J7				4/8/19		0940		CC		SO		1				D40
4		BS-K7				4/8/19		0950		CC		SO		1				
5		BS-J7T				4/8/19		1100		CC		SO		1				
6		BS-K7T				4/8/19		1115		CC		SO		1				
7		BS-K6T				4/8/19		1315		CC		SO		1				

Turnaround Time (Business days)		Data Deliverable Information				Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDS <input type="checkbox"/> Other	
Emergency & Rush TIA data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.				INITIAL ASSESSMENT 2A(1) LABEL VERIFICATION _____ Sample inventory is verified upon receipt in the Laboratory	

Relinquished by Sampler: Christina Cifelli		Date Time: 4/8/19 1450		Received By: Katrin Schaubert		Date Time: 4/8/19 1715	
Relinquished by Sampler:		Date Time:		Received By:		Date Time:	
Relinquished by:		Date Time:		Received By:		Date Time:	
Relinquished by:		Date Time:		Received By:		Date Time:	
Custody Seal # 34198		<input type="checkbox"/> Intact		<input type="checkbox"/> Not intact		Preserved where applicable <input type="checkbox"/>	
						On Ice <input type="checkbox"/> Cooler Temp. 3.3°C	



5.2
5

Report of Analysis

Client Sample ID: FB(20190408)	Date Sampled: 04/08/19
Lab Sample ID: JC85965-1	Date Received: 04/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/08/19 22:50	JO	SW846 7196A
Redox Potential Vs H2	763		mv	1	04/09/19 20:01	EB	ASTM D1498-76
pH ^a	5.75		su	1	04/08/19 17:33	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I7A	Date Sampled: 04/08/19
Lab Sample ID: JC85965-2	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	401		mv	1	04/09/19 21:47	EB	ASTM D1498-76M
Solids, Percent	80.4		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	6.95		su	1	04/09/19 21:43	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J7	Date Sampled: 04/08/19
Lab Sample ID: JC85965-3	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 82.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	319		mv	1	04/09/19 21:53	EB	ASTM D1498-76M
Solids, Percent	82		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	7.15		su	1	04/09/19 21:51	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K7		Date Sampled: 04/08/19
Lab Sample ID: JC85965-4		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	344		mv	1	04/09/19 21:56	EB	ASTM D1498-76M
Solids, Percent	80.7		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	6.85		su	1	04/09/19 21:56	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-5	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	351		mv	1	04/09/19 21:58	EB	ASTM D1498-76M
Solids, Percent	81.1		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	6.92		su	1	04/09/19 21:58	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-6	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	290		mv	1	04/09/19 22:00	EB	ASTM D1498-76M
Solids, Percent	78.6		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	7.44		su	1	04/09/19 22:00	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K6T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-7	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/09/19 20:00	JOO	SW846 3060A/7196A
Redox Potential Vs H2	297		mv	1	04/09/19 22:05	EB	ASTM D1498-76M
Solids, Percent	80.7		%	1	04/09/19 09:11	RC	SM2540 G 18TH ED MOD
pH	7.10		su	1	04/09/19 22:05	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-I7A	Date Sampled: 04/08/19
Lab Sample ID: JC85965-2R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.50	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J7	Date Sampled: 04/08/19
Lab Sample ID: JC85965-3R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 82.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52	0.49	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K7	Date Sampled: 04/08/19
Lab Sample ID: JC85965-4R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.92	0.50	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-5R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-K7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-6R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/20/19 14:02	JOO	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K6T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-7R	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/20/19 14:02	JOO	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190408)		Date Sampled: 04/08/19
Lab Sample ID: JC85965-1A		Date Received: 04/08/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/08/19	04/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/08/19	04/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/08/19	04/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/08/19	04/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/08/19	04/09/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP13984

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190408)	Date Sampled: 04/08/19
Lab Sample ID: JC85965-1A	Date Received: 04/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/09/19 16:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I7A		Date Sampled: 04/08/19
Lab Sample ID: JC85965-2A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.0	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	4.9	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	14.6	6.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I7A	Date Sampled: 04/08/19
Lab Sample ID: JC85965-2A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.0	1.7	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J7		Date Sampled: 04/08/19
Lab Sample ID: JC85965-3A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 82.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	19.7	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.9	5.0	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	6.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J7	Date Sampled: 04/08/19
Lab Sample ID: JC85965-3A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 82.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.2	1.7	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K7		Date Sampled: 04/08/19
Lab Sample ID: JC85965-4A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	20.0	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.7	4.9	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.7	6.1	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-K7	Date Sampled: 04/08/19
Lab Sample ID: JC85965-4A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.0	1.7	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J7T		Date Sampled: 04/08/19
Lab Sample ID: JC85965-5A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.1	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.3	5.1	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	6.4	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-J7T		Date Sampled: 04/08/19
Lab Sample ID: JC85965-5A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.1	1.8	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-6A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.7	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	5.2	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	17.6	6.6	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K7T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-6A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.7	1.8	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K6T		Date Sampled: 04/08/19
Lab Sample ID: JC85965-7A		Date Received: 04/08/19
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.4	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.7	5.0	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.3	6.3	mg/kg	1	04/09/19	04/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46468

(2) Prep QC Batch: MP14022

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-K6T	Date Sampled: 04/08/19
Lab Sample ID: JC85965-7A	Date Received: 04/08/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4	1.8	mg/kg	1	04/09/19 20:00	JOO	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC86027, JC86122, JC86206, and JC86304

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33485R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC86027, JC86122, JC86206, and JC86304 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC86027	FB(2019049)	JC86027-1	Water	4/9/2019		X	X	X
	BS-K8	JC86027-2	Soil	4/9/2019		X	X	X
	BS-J8	JC86027-3	Soil	4/9/2019		X	X	X
	BS-I8	JC86027-4	Soil	4/9/2019		X	X	X
	BS-J10	JC86027-5	Soil	4/9/2019		X	X	X
	BS-I10	JC86027-6	Soil	4/9/2019		X	X	X
	DUP-24(20190409)	JC86027-7	Soil	4/9/2019		X	X	X
	BS-G18	JC86027-8	Soil	4/9/2019	BS-J10	X	X	X
JC86122	FB(20190410)	JC86122-1	Water	4/10/2019		X	X	X
	BS-F19	JC86122-2	Soil	4/10/2019		X	X	X
	BS-I9S	JC86122-3	Soil	4/10/2019		X	X	X
	BS-I9D	JC86122-4	Soil	4/10/2019		X	X	X
	BS-J9	JC86122-5	Soil	4/10/2019		X	X	X
JC86206	FB(20190411)	JC86206-1	Water	4/11/2019		X	X	X
	BS-H18	JC86206-2	Soil	4/11/2019		X	X	X
	BS-G19	JC86206-3	Soil	4/11/2019		X	X	X
JC86304	FB(20190412)	JC86304-1	Water	4/12/2019		X	X	X
	BS-K8A	JC86304-2	Soil	4/12/2019		X	X	X
	BS-J8A	JC86304-3	Soil	4/12/2019		X	X	X
	BS-I8A	JC86304-4	Soil	4/12/2019		X	X	X
	BS-H19	JC86304-5	Soil	4/12/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.

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3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC86027, JC86122, and JC86304: Miscellaneous parameters for samples BS-I10, BS-F19, and BS-J8A also include ferrous iron, sulfide screen, and total organic carbon (TOC).

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ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

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INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC86122 and JC86206: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC86027 and JC86304: The MS/MSD analysis performed on sample locations BS-I10 and BS-K8A exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-I10	Antimony	58.5%	58.6%
BS-K8A	Antimony	59.9%	60.5%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

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matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC86027 and JC86304: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-I10 and BS-K8A. The MS/MSD recoveries exhibited acceptable RPDs.

SDGs #JC86122 and JC86206: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J10 / DUP-24(20190409)	Nickel	12.9	11.5	AC
	Vanadium	25.5	15.5	
	Chromium	15.9	11.2	34.7%
	Trivalent Chromium	15.9	11.2	34.7%

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-J10 and field duplicate sample DUP-24(20190409) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

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SDGs #JC86027 and JC86304: The serial dilution analysis performed using samples BS-I10 and BS-K8A exhibited %D within the control limits.

SDGs #JC86122 and JC86206: The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC86206: The MS analysis was not performed using a sample from this SDG.

SDGs #JC86027, JC86122, and JC86304: The MS analysis performed on sample locations BS-I10, BS-F19, and BS-J8A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-I10	Hexavalent Chromium, Insoluble	55.3%	< 50%
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-F19	Hexavalent Chromium, Insoluble	< 50%	66.5%
	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-J8A	Hexavalent Chromium, Insoluble	58.6%	AC (82.0%)
	Hexavalent Chromium, Soluble	< 50%	51.7%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC86027 and JC86304: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC86122: The reanalyses of the field samples are usable with appropriate qualification. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC86027: The PDS analysis performed on sample location BS-I10 exhibited recoveries within the control limits.

SDG #JC86206: The PDS analysis was not performed using a sample from this SDG.

SDGs #JC86122 and JC86304: The PDS analysis performed on sample locations BS-F19 and BS-J8A exhibited a recovery outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-F19	Hexavalent Chromium	< 85%	< 85%
BS-J8A	Hexavalent Chromium	< 85%	AC (85.4%)

Notes:

AC = Acceptable

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC86027, JC86122, and JC86304: The laboratory duplicate analysis performed on sample locations BS-I10, BS-F19, and BS-J8A exhibited results within the control limit.

SDG #JC86206: The laboratory duplicate analysis was not performed using a sample from this SDG.

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5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J10 / DUP-24(20190409)	Hexavalent Chromium	0.48 U	0.49 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample BS-J10 and field duplicate sample DUP-24(20190409).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190411)	SM4500H+B	Analysis: 4 days	< 24 hours of receipt by laboratory
BS-F19 BS-I9S BS-I9D BS-J9 BS-J8A BS-I8A BS-J19	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-J8A BS-F19 BS-I10	ASTM D3872-86	Analysis: 14 days Analysis: 16 days Analysis: 17 days	< 24 hours from collection
BS-J8A BS-F19 BS-I10	SM4500S2-A	Analysis: 14 days Analysis: 16 days Analysis: 17 days	< 7 days from collection
BS-I10 BS-J8A	Lloyd Kahn	Analysis: 16 days Analysis: 19 days	< 14 days from collection

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Sample Locations	Method	Holding Time	Criteria
BS-F19		Analysis: 22 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC86027 and JC86206: The laboratory duplicate analysis performed on sample location BS-I10 and BS-H18 exhibited results within the control limit.

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SDGs #JC86122 and JC86304: The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J10 / DUP-24(20190409)	Redox	244	244	0.0%
	pH	7.05	7.06	0.1%

The differences in the results between the parent sample BS-J10 and field duplicate sample DUP-24(20190409) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 23, 2019

PEER REVIEW: Dennis Capria

DATE: August 13, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO PR

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

E

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC86027

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes							
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank							
Street Address: 10 Friends Lane		Street: 18 Chapel Avenue																								
City: Newtown PA 18940		City: Jersey City NJ																								
Project Contact: Krista Marzocci		Project #: NP000770.0003.00008																								
Phone #: 610.755.7090		Client Purchase Order #																								
Sampler(s) Name(s): Christa Cifelli		Project Manager: Jim McLaughlin, Jr.																								
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles										LAB USE ONLY
																<input type="checkbox"/> PCB <input type="checkbox"/> NiCr <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> NONE <input type="checkbox"/> DI Water <input type="checkbox"/> MESH <input type="checkbox"/> ENCORE										
1		FB(20190409)				4/9/19		0800		CC		FB		2												
2		BS-K8				4/9/19		0930		CC		SO		1												A11
3		BS-J8				4/9/19		0940		CC		SO		1												659
4		BS-I8				4/9/19		0950		CC		SO		1												DI
5		BS-J10				4/9/19		1240		CC		SO		1												
6		BS-I10				4/9/19		1230		CC		SO		1												
7		BS-I10MS				4/9/19		1230		CC		SO		1												
8		DUP-24(20190409)				4/9/19				CC		SO		1												
9		BS-G18				4/9/19		1415		CC		SO		1												

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions													
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____ _____ _____ _____ _____ _____										Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data							NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other						
Emergency & Rush TIA data available via LabLink		Sample inventory is verified upon receipt in the Laboratory										INITIAL ASSESSMENT 3A LABEL VERIFICATION _____													

Relinquished by Sampler: [Signature]		Date/Time: 4/9/19 1445		Received By: [Signature]		Date/Time: 4/9/19 245		Relinquished By: [Signature]		Date/Time: 4/9/19		Received By: [Signature]		Date/Time: 4/9/19		Received By: [Signature]	
Relinquished by Sampler:		Date/Time:		Received By:		Date/Time:		Relinquished By:		Date/Time:		Received By:		Date/Time:		Received By:	
Relinquished by:		Date/Time:		Received By:		Date/Time:		Relinquished By:		Date/Time:		Received By:		Date/Time:		Received By:	

Custody Seal # **11200** Intact Not intact

Preserved where applicable On ice Cooler

5.2
5



Report of Analysis

Client Sample ID: FB(20190409) Lab Sample ID: JC86027-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/09/19 Date Received: 04/09/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/09/19 23:05	JO	SW846 7196A
Redox Potential Vs H2	473		mv	1	04/10/19 22:35	EB	ASTM D1498-76
pH ^a	5.64		su	1	04/09/19 17:00	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-K8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-2	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	259		mv	1	04/10/19 21:45	EB	ASTM D1498-76M
Solids, Percent	77.9		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	6.86		su	1	04/10/19 21:45	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-3	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	04/10/19 21:48	EB	ASTM D1498-76M
Solids, Percent	77.7		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	6.96		su	1	04/10/19 21:48	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-4	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	280		mv	1	04/10/19 21:51	EB	ASTM D1498-76M
Solids, Percent	80.6		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	6.52		su	1	04/10/19 21:51	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J10	Date Sampled: 04/09/19
Lab Sample ID: JC86027-5	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	244		mv	1	04/10/19 21:57	EB	ASTM D1498-76M
Solids, Percent	82.5		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	7.05		su	1	04/10/19 21:57	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I10	Date Sampled: 04/09/19
Lab Sample ID: JC86027-6	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	04/11/19 12:42	RI	SW846 3060A/7196A
Redox Potential Vs H2	714		mv	1	04/10/19 20:23	EB	ASTM D1498-76M
Solids, Percent	83.2		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	6.77		su	1	04/10/19 20:23	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-24(20190409)		Date Sampled: 04/09/19
Lab Sample ID: JC86027-7		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	244		mv	1	04/10/19 22:03	EB	ASTM D1498-76M
Solids, Percent	82.1		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	7.06		su	1	04/10/19 22:03	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-G18	Date Sampled: 04/09/19
Lab Sample ID: JC86027-8	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	04/11/19 12:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	237		mv	1	04/10/19 22:10	EB	ASTM D1498-76M
Solids, Percent	71.3		%	1	04/10/19 09:56	RC	SM2540 G 18TH ED MOD
pH	6.93		su	1	04/10/19 22:10	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-2R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/19/19 17:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-3R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/19/19 17:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-4R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/19/19 17:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J10	Date Sampled: 04/09/19
Lab Sample ID: JC86027-5R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/19/19 17:57	RI	SW846-3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I10	Date Sampled: 04/09/19
Lab Sample ID: JC86027-6R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/19/19 17:50	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-I10		Date Sampled: 04/09/19
Lab Sample ID: JC86027-6RT		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.6 J	0.20	%	1	04/26/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	04/26/19 09:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	3260 J	120	mg/kg	1	04/25/19 13:04	CD	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-24(20190409)	Date Sampled: 04/09/19
Lab Sample ID: JC86027-7R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55	0.49	mg/kg	1	04/19/19 17:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-G18	Date Sampled: 04/09/19
Lab Sample ID: JC86027-8R	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	04/19/19 17:57	RI	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: FB(20190409) Lab Sample ID: JC86027-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/09/19 Date Received: 04/09/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/09/19	04/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/09/19	04/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/09/19	04/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/09/19	04/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/09/19	04/10/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46476

(2) Prep QC Batch: MP14030

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190409)	Date Sampled: 04/09/19
Lab Sample ID: JC86027-1A	Date Received: 04/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/10/19 12:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-K8		Date Sampled: 04/09/19
Lab Sample ID: JC86027-2A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.1	1.3	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	32.7	5.1	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.2	6.4	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-2A	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.1	1.8	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J8		Date Sampled: 04/09/19
Lab Sample ID: JC86027-3A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 77.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.2	1.2	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.7	4.9	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	6.1	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J8	Date Sampled: 04/09/19
Lab Sample ID: JC86027-3A	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 77.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.2	1.7	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I8		Date Sampled: 04/09/19
Lab Sample ID: JC86027-4A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	17.3	1.3	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.9	5.0	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	28.6	6.3	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I8		Date Sampled: 04/09/19
Lab Sample ID: JC86027-4A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.3	1.8	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J10		Date Sampled: 04/09/19
Lab Sample ID: JC86027-5A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	15.9	1.3	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.9	5.1	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.5	6.3	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-J10	Date Sampled: 04/09/19
Lab Sample ID: JC86027-5A	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.9	1.8	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I10		Date Sampled: 04/09/19
Lab Sample ID: JC86027-6A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	19.6	1.2	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.4	4.7	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.9	5.8	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-I10		Date Sampled: 04/09/19
Lab Sample ID: JC86027-6A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.6	1.7	mg/kg	1	04/11/19 12:42	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: DUP-24(20190409)		Date Sampled: 04/09/19
Lab Sample ID: JC86027-7A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.2	1.2	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	5.0	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	15.5	6.2	mg/kg	1	04/10/19	04/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: DUP-24(20190409)	Date Sampled: 04/09/19
Lab Sample ID: JC86027-7A	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.2	1.7	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-G18		Date Sampled: 04/09/19
Lab Sample ID: JC86027-8A		Date Received: 04/09/19
Matrix: SO - Soil		Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.7	1.4	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.9	5.7	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	7.1	mg/kg	1	04/10/19	04/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46479

(2) Prep QC Batch: MP14042

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-G18	Date Sampled: 04/09/19
Lab Sample ID: JC86027-8A	Date Received: 04/09/19
Matrix: SO - Soil	Percent Solids: 71.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.7	2.0	mg/kg	1	04/11/19 12:47	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsus

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **AK-D4719-211'**
SGS Job # **JC86122**

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Hexavalent Chromium Trivalent Chromium Arsenic Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinsate Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																	
City: Newtown PA 18940		City: Jersey City NJ																	
Project Contact: Lash Meharala		Project #: NP000770, 0003, 0028																	
Phone #: 610.755.7080		Client Purchase Order #:																	
Supervisor(s) Name(s): Christa C. Lelli 201.264.8000		Project Manager: Jim McLugile, Jr.																	
SGS Sample #	Field ID / Point of Collection	MECH/ID/Vial #	Date	Time	Sampled by	Grab (G) (Core) (C)	Matrix	# of bottles	HC	NO ₃	NO ₂	AS ₃	AS ₆	DI	DI	EMERGE	LAB USE ONLY		
1	FB(20190410)		4/10/19	0945	CC	G	FB	2									A12		
2	BS-F19		4/10/19	1010	CC	G	SO	1									G56		
3	BS-I95		4/10/19	1200	CC	G	SO	1									DS1		
4	BS-I9D		4/10/19	1210	CC	G	SO	1											
5	BS-J9		4/10/19	1220	CC	G	SO	1											
Turn Around Time (Business Days) _____ Approved by (SGS PM) / Date: _____ <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ All data available via Lablink _____ Approval needed for 1-3 Business Day TAT																			
Deliverable _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDO Form: Edus <input type="checkbox"/> DOD-QSMS Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions																			
Sample Custody must be documented below each time samples change possession, including courier delivery.																			
Relinquished by: [Signature]		Date / Time: 4/10/19 1410		Received by: Robert Chambers		Date / Time: 4/10/19 1524		Relinquished by: Robert Chambers		Date / Time: 4/10/19		Received by: [Signature]		Date / Time: 4/10/19		Received by: [Signature]			
Relinquished by: [Signature]		Date / Time: 4/10/19		Received by: 3		Date / Time: 4/10/19		Relinquished by: 4		Date / Time: 4/10/19		Received by: 4		Date / Time: 4/10/19		Received by: 4			
Relinquished by: [Signature]		Date / Time: 4/10/19		Received by: 5		Date / Time: 4/10/19		Relinquished by: 5		Date / Time: 4/10/19		Received by: 5		Date / Time: 4/10/19		Received by: 5			
Custom Seal # 12458 <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact Preserved where applicable <input checked="" type="checkbox"/> Absent Therm. ID EP 310C																			

INITIAL ASSESSMENT 3B DM
LABEL VERIFICATION _____

EHS-A-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190410)	Date Sampled: 04/10/19
Lab Sample ID: JC86122-1	Date Received: 04/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/10/19 23:40	JO	SW846 7196A
Redox Potential Vs H2	416		mv	1	04/12/19 20:22	JO	ASTM D1498-76
pH ^a	5.55		su	1	04/10/19 15:50	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F19	Date Sampled: 04/10/19
Lab Sample ID: JC86122-2	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	04/15/19 11:59	RI	SW846 3060A/7196A
Redox Potential Vs H2	74.4		mv	1	04/13/19 14:56	EB	ASTM D1498-76M
Solids, Percent	67.5		%	1	04/11/19 08:51	RC	SM2540 G 18TH ED MOD
pH	8.45 J		su	1	04/13/19 14:41	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I9S	Date Sampled: 04/10/19
Lab Sample ID: JC86122-3	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	04/15/19 12:07	RI	SW846 3060A/7196A
Redox Potential Vs H2	377		mv	1	04/13/19 15:10	EB	ASTM D1498-76M
Solids, Percent	79		%	1	04/11/19 08:51	RC	SM2540 G 18TH ED MOD
pH	7.18 J		su	1	04/13/19 14:44	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I9D	Date Sampled: 04/10/19
Lab Sample ID: JC86122-4	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/15/19 12:07	RI	SW846 3060A/7196A
Redox Potential Vs H2	333		mv	1	04/13/19 15:13	EB	ASTM D1498-76M
Solids, Percent	82.8		%	1	04/11/19 08:51	RC	SM2540 G 18TH ED MOD
pH	6.87 J		su	1	04/13/19 14:47	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J9	Date Sampled: 04/10/19
Lab Sample ID: JC86122-5	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.51	mg/kg	1	04/15/19 12:07	RI	SW846 3060A/7196A
Redox Potential Vs H2	214		mv	1	04/13/19 15:16	EB	ASTM D1498-76M
Solids, Percent	78.9		%	1	04/11/19 08:51	RC	SM2540 G 18TH ED MOD
pH	6.77 J		su	1	04/13/19 14:50	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F19	Date Sampled: 04/10/19
Lab Sample ID: JC86122-2R	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59 UJ-	0.59	mg/kg	1	04/23/19 15:44	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F19		Date Sampled: 04/10/19
Lab Sample ID: JC86122-2RT		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.56 J	0.20	%	1	04/26/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	04/26/19 09:00	MP	SM4500S2-A-11 ^R
Total Organic Carbon ^c	50600 J	150	mg/kg	1	05/02/19 00:13	JO	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I9S	Date Sampled: 04/10/19
Lab Sample ID: JC86122-3R	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62 J-	0.51	mg/kg	1	04/23/19 15:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I9D	Date Sampled: 04/10/19
Lab Sample ID: JC86122-4R	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	04/23/19 15:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J9		Date Sampled: 04/10/19
Lab Sample ID: JC86122-5R		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84 J-	0.51	mg/kg	1	04/23/19 15:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20190410)		Date Sampled: 04/10/19
Lab Sample ID: JC86122-1A		Date Received: 04/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46484

(2) Prep QC Batch: MP14094

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190410)	Date Sampled: 04/10/19
Lab Sample ID: JC86122-1A	Date Received: 04/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/11/19 16:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F19		Date Sampled: 04/10/19
Lab Sample ID: JC86122-2A		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	6.3	1.5	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	6.8	6.1	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	8.9	7.6	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46484

(2) Prep QC Batch: MP14093

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F19	Date Sampled: 04/10/19
Lab Sample ID: JC86122-2A	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 67.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	6.3	2.1	mg/kg	1	04/15/19 11:59	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I9S	Date Sampled: 04/10/19
Lab Sample ID: JC86122-3A	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.8	1.3	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.1	5.2	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	6.5	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46484

(2) Prep QC Batch: MP14093

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I9S		Date Sampled: 04/10/19
Lab Sample ID: JC86122-3A		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.8 12.2	1.8	mg/kg	1	04/15/19 12:07	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I9D	Date Sampled: 04/10/19
Lab Sample ID: JC86122-4A	Date Received: 04/10/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	11.4	1.2	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	4.6	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	5.8	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46484

(2) Prep QC Batch: MP14093

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I9D		Date Sampled: 04/10/19
Lab Sample ID: JC86122-4A		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.4	1.7	mg/kg	1	04/15/19 12:07	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J9		Date Sampled: 04/10/19
Lab Sample ID: JC86122-5A		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.6	1.3	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.7	5.0	mg/kg	1	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.5	2.5	mg/kg	2	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	26.0	13	mg/kg	2	04/11/19	04/11/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46484

(2) Prep QC Batch: MP14093

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J9		Date Sampled: 04/10/19
Lab Sample ID: JC86122-5A		Date Received: 04/10/19
Matrix: SO - Soil		Percent Solids: 78.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.6 13.8	1.8	mg/kg	1	04/15/19 12:07	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



50
PM

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

15

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC86206

Company Name Arcadis		Project Name PPG Jersey City Site 107		Requested Analysis (see TEST CODE sheet)										Matrix Codes																													
Street Address 10 Friends Lane		Street 18 Chapel Ave.		<table border="1"> <tr><td>Total Chromium</td><td>Hexavalent Chromium</td><td>Trivalent Chromium</td><td>Antimony</td><td>Nickel</td><td>Thallium</td><td>Vanadium</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>										Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony	Nickel	Thallium	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Total Chromium	Hexavalent Chromium	Trivalent Chromium	Antimony											Nickel	Thallium	Vanadium																											
X	X	X	X											X	X	X																											
X	X	X	X											X	X	X																											
X	X	X	X											X	X	X																											
City Newtown PA		City Jersey City NJ		Billing Information (if different from Report to)		Company Name																																					
State PA		State NJ		Project #		Street Address																																					
Zip 18940		Zip 07003		Client Purchase Order #		City																																					
Project Contact Krish Muthucala		Project # NP000770.0003.00008		Street Address		State																																					
Phone # 610.755.7080		Client Purchase Order #		City		Zip																																					
Sample(s) Name(s) Antisha C. Relli		Project Manager Sim McLaughlin, Jr.		Attention:																																							
Phone # 201.264.8065																																											
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles										LAB USE ONLY																	
																<input type="checkbox"/> HCl <input type="checkbox"/> MESH <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> HClO4 <input type="checkbox"/> DI Water <input type="checkbox"/> MESH <input type="checkbox"/> ENCORE																											
1		FB(20190411)				4/11/19		0700		CC		FB		2																													
2		BS-H1B				4/11/19		1300		CC		SO		1																													
3		BS-G19				4/11/19		1330		CC		SO		1																													

Turnaround Time (Business days)		Approved by (SGS Project Manager) Date:		Data Deliverable Information										Comments / Special Instructions	
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDU15 <input type="checkbox"/> Other	
Emergency & Rush TIA data available via LabLink														INITIAL ASSESSMENT AR PM	

Relinquished by Sampler		Date/Time		Received By		Date/Time		Relinquished By		Date/Time		Received By	
1 Antisha C. Relli		4/11/19 1425		[Signature]		4/11/19 1615		[Signature]		4/11/19 1615		[Signature]	
3				3				4				4	
5				5				Custody Bag # 2222		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		<input checked="" type="checkbox"/> Preserved (if applicable) <input type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp.	

A11
G60
D36

5.2
5



Report of Analysis

Client Sample ID: FB(20190411) Lab Sample ID: JC86206-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/11/19 Date Received: 04/11/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/11/19 23:50	JO	SW846 7196A
Redox Potential Vs H2	467		mv	1	04/12/19 12:49	JOO	ASTM D1498-76
pH ^a	6.84 J		su	1	04/15/19 15:34	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H18	Date Sampled: 04/11/19
Lab Sample ID: JC86206-2	Date Received: 04/11/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64	0.64	mg/kg	1	04/15/19 12:07	RI	SW846 3060A/7196A
Redox Potential Vs H2	228		mv	1	04/12/19 12:33	JOO	ASTM D1498-76M
Solids, Percent	62.6		%	1	04/12/19 10:07	RC	SM2540 G 18TH ED MOD
pH	6.36		su	1	04/12/19 12:33	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G19	Date Sampled: 04/11/19
Lab Sample ID: JC86206-3	Date Received: 04/11/19
Matrix: SO - Soil	Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	04/15/19 12:07	RI	SW846 3060A/7196A
Redox Potential Vs H2	194		mv	1	04/12/19 12:39	JOO	ASTM D1498-76M
Solids, Percent	67.9		%	1	04/12/19 10:07	RC	SM2540 G 18TH ED MOD
pH	6.61		su	1	04/12/19 12:39	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H18	Date Sampled: 04/11/19
Lab Sample ID: JC86206-2R	Date Received: 04/11/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.64	mg/kg	1	04/23/19 15:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G19	Date Sampled: 04/11/19
Lab Sample ID: JC86206-3R	Date Received: 04/11/19
Matrix: SO - Soil	Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59	0.59	mg/kg	1	04/23/19 15:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190411) Lab Sample ID: JC86206-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/11/19 Date Received: 04/11/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46494

(2) Prep QC Batch: MP14139

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190411)	Date Sampled: 04/11/19
Lab Sample ID: JC86206-1A	Date Received: 04/11/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/12/19 16:24	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H18		Date Sampled: 04/11/19
Lab Sample ID: JC86206-2A		Date Received: 04/11/19
Matrix: SO - Soil		Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.6	1.5	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	18.3	6.1	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.2	7.7	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46494

(2) Prep QC Batch: MP14140

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H18	Date Sampled: 04/11/19
Lab Sample ID: JC86206-2A	Date Received: 04/11/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.6	2.1	mg/kg	1	04/15/19 12:07	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G19		Date Sampled: 04/11/19
Lab Sample ID: JC86206-3A		Date Received: 04/11/19
Matrix: SO - Soil		Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.7	1.4	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.7	5.7	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.3	7.1	mg/kg	1	04/12/19	04/12/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46494

(2) Prep QC Batch: MP14140

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G19		Date Sampled: 04/11/19
Lab Sample ID: JC86206-3A		Date Received: 04/11/19
Matrix: SO - Soil		Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.7	2.0	mg/kg	1	04/15/19 12:07	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SO
SFB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control # AK-01719-212
SGS Quote #
SGS Job # JC86304

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)										Matrix Codes	
Company Name Arcadis		Project Name PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Street Address 10 Friends Lane		Street 18 Chapel Ave																					
City State Zip Newtown PA 18940		City State Jersey City NJ																					Billing Information (if different from Report to)
Project Contact Krista Mastrocola		Project # NF000770.0003.0008																					Company Name
Phone # 610-755-7080		Client Purchase Order #																					Street Address
Sample Name(s) Christina C.elli		Project Manager Jim McLaughlin Jr.										City	State	Zip	Attention:								
Lab Sample #	Field ID / Point of Collection	MEOH/IDI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NiOH	HNO3	H2SO4	HNOH	D/Water	MESH	ENCLOSURE	Number of preserved bottles	LAB USE ONLY						
1	FB(20190412)		4/12/19	1230	CC	FB	2																
2	BS-K8A		4/12/19	1210	CC	SO	1											A19					
3	BS-38A		4/12/19	1215	CC	SO	1											C19					
4	BS-78A		4/12/19	1220	CC	SO	1																
5	BS-H19		4/12/19	1330	CC	SO	1											DS4					

5.2
5

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions									
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EAAs <input type="checkbox"/> Other									
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time samples change possession, including courier delivery.										Sample inventory LABEL VERIFICATION									
Relinquished by Sampler: C.elli	Date Time: 4/12/19 1405	Received By: Robert Chambers	Date Time: 4/12/19 1625	Relinquished By: Robert Chambers	Date Time: 4/12/19	Received By: [Signature]	Date Time: 4/12/19	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:	Relinquished By:	Date Time:	Received By:	Date Time:		
Custody Seal # 27904	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/>	Cooler Temp 3.10C																	



Report of Analysis

Client Sample ID: FB(20190412)		Date Sampled: 04/12/19
Lab Sample ID: JC86304-1		Date Received: 04/12/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/12/19 23:25	JO	SW846 7196A
Redox Potential Vs H2	388		mv	1	04/15/19 23:44	EB	ASTM D1498-76
pH ^a	5.68		su	1	04/12/19 16:50	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-K8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-2	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	04/16/19 10:26	RI	SW846 3060A/7196A
Redox Potential Vs H2	259		mv	1	04/13/19 15:30	EB	ASTM D1498-76M
Solids, Percent	83.7		%	1	04/15/19 16:05	BG	SM2540 G 18TH ED MOD
pH	6.57		su	1	04/13/19 14:19	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-3	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	04/16/19 10:21	RI	SW846 3060A/7196A
Redox Potential Vs H2	277		mv	1	04/15/19 18:45	JO	ASTM D1498-76M
Solids, Percent	84.1		%	1	04/15/19 16:05	BG	SM2540 G 18TH ED MOD
pH	6.89 J		su	1	04/15/19 18:58	JO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-4	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0 J-	0.48	mg/kg	1	04/16/19 10:26	RI	SW846 3060A/7196A
Redox Potential Vs H2	283		mv	1	04/15/19 18:58	JO	ASTM D1498-76M
Solids, Percent	84		%	1	04/15/19 16:05	BG	SM2540 G 18TH ED MOD
pH	6.41 J		su	1	04/15/19 18:58	JO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H19	Date Sampled: 04/12/19
Lab Sample ID: JC86304-5	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.63 UJ-	0.63	mg/kg	1	04/16/19 10:26	RI	SW846 3060A/7196A
Redox Potential Vs H2	273		mv	1	04/15/19 19:05	JO	ASTM D1498-76M
Solids, Percent	63		%	1	04/15/19 16:05	BG	SM2540 G 18TH ED MOD
pH	6.63 J		su	1	04/15/19 19:05	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-2R	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68	0.48	mg/kg	1	04/24/19 12:39	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-3R	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/24/19 12:34	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J8A		Date Sampled: 04/12/19
Lab Sample ID: JC86304-3RT		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.84 J	0.20	%	1	04/26/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE U			1	04/26/19 09:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	14400 J	120	mg/kg	1	05/01/19 23:28	JO	LLOYD KAHN 1988 MOD

- (a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-4R	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.53	0.48	mg/kg	1	04/24/19 12:39	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H19	Date Sampled: 04/12/19
Lab Sample ID: JC86304-5R	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.73	0.63	mg/kg	1	04/24/19 12:39	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190412)		Date Sampled: 04/12/19
Lab Sample ID: JC86304-1A		Date Received: 04/12/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46509

(2) Prep QC Batch: MP14194

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190412)	Date Sampled: 04/12/19
Lab Sample ID: JC86304-1A	Date Received: 04/12/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/15/19 17:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K8A		Date Sampled: 04/12/19
Lab Sample ID: JC86304-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.8	1.2	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.0	4.8	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.0	6.0	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46509

(2) Prep QC Batch: MP14195

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K8A		Date Sampled: 04/12/19
Lab Sample ID: JC86304-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 83.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.4	1.7	mg/kg	1	04/16/19 10:26	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-3A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.7	1.2	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.6	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.2	5.8	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46509

(2) Prep QC Batch: MP14195

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J8A		Date Sampled: 04/12/19
Lab Sample ID: JC86304-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 84.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.7	1.7	mg/kg	1	04/16/19 10:21	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I8A		Date Sampled: 04/12/19
Lab Sample ID: JC86304-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.6 UJ-	4.6	mg/kg	2	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	17.4	2.3	mg/kg	2	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	12.1	4.6	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.6	5.7	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46509

(2) Prep QC Batch: MP14195

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I8A	Date Sampled: 04/12/19
Lab Sample ID: JC86304-4A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.4	2.8	mg/kg	1	04/16/19 10:26	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H19		Date Sampled: 04/12/19
Lab Sample ID: JC86304-5A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0 UJ-	3.0	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	28.6	1.5	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.5	6.0	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.9	7.6	mg/kg	1	04/13/19	04/15/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46509

(2) Prep QC Batch: MP14195

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-H19	Date Sampled: 04/12/19
Lab Sample ID: JC86304-5A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.6	2.1	mg/kg	1	04/16/19 10:26	RI	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), Pesticides, Polychlorinated Biphenyls (PCBs), Extractable Petroleum Hydrocarbon (EPH), Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC86307

Analyses Performed By:
SGS Accutest
Dayton, New Jersey

Report #33486R
Review Level: Tier III
Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC86307 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis							
					VOC	SVOC	PEST	PCB	EPH	Cr VI	MET	MISC
RB-01	JC86307-1	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-02	JC86307-2	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-03	JC86307-3	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-04	JC86307-4	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-05	JC86307-5	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-06	JC86307-6	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-07	JC86307-7	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-08	JC86307-8	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-09	JC86307-9	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-10	JC86307-10	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-11	JC86307-11	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-12	JC86307-12	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-13	JC86307-13	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-14	JC86307-14	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-15	JC86307-15	Soil	4/12/2019		X	X	X	X	X	X	X	X
RB-DUP-01	JC86307-16	Soil	4/12/2019	RB-08	X	X	X	X	X	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH, redox potential, and cyanide.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260C, 8270D, 8081B, and 8082A, and New Jersey Department of Environmental Protection Extractable Petroleum Hydrocarbon Method (NJDEP EPH). Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999, New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound limit of detection.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260C	Soil	14 days from analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable, and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (20%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

DATA REVIEW REPORT

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
RB-14	Continuing Calibration Verification %D	Dichlorodifluoromethane	-21.4%
RB-15		Bromomethane	-26.3%
RB-DUP-01			

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF < 0.05	Non-detect	R
		Detect	J
	RRF < 0.01 ¹	Non-detect	R
		Detect	J
	RRF > 0.05 or RRF > 0.01 ¹	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 20% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD > 90%	Non-detect	R
		Detect	J
Continuing Calibration	%D > 20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D > 20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D > 90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

Note:

¹ RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

DATA REVIEW REPORT

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited recoveries outside of the control limits as presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
RB-01	Acetone	> UL	NA
	Cyclohexane		
	Trichlorofluoromethane		
RB-15	Acetone	> UL	NA
	2-Butanone		

Note:

NA MSD analysis not performed

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

DATA REVIEW REPORT

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J+
< the lower control limit (LL) but > 10%	Non-detect	UJ-
	Detect	J-
< 10%	Non-detect	R
	Detect	J-

Laboratory duplicate analysis was performed in place of MSD due to limited sample volume in order to assess the laboratory precision. The laboratory duplicate analysis performed using sample locations RB-02 and RB-DUP-01 exhibited acceptable results.

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	Acetone	10 U	3.7 J	AC

Notes:

AC Acceptable

The difference in the acetone results between the parent sample RB-08 and field duplicate sample RB-DUP-01 was acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Level II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Trip blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Level III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

DATA REVIEW REPORT

VOCs: SW-846 8260C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
RB-01 RB-02 RB-03 RB-04 RB-05 RB-06 RB-07 RB-08 RB-09 RB-10 RB-11 RB-12 RB-13 RB-14 RB-15 RB-DUP-01	TIC: System artifact, RT = 2.10	Detected sample results less than 5 times blank result	R

Note:

RT Retention time

DATA REVIEW REPORT

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable, and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (20%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All initial calibration and continuing calibration results were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established

DATA REVIEW REPORT

acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed using sample RB-01 exhibited recoveries and RPDs within the acceptance limits.

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	All compounds	U	U	AC

Notes:

AC Acceptable

There were no SVOCs detected in the parent sample RB-08 and field duplicate sample RB-DUP-01.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270D	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Level II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Level III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

DATA REVIEW REPORT

SVOCs: SW-846 8270D	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
D. Quantitation transcriptions/calculations		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

PESTICIDE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8081B	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% is allowed or a correlation coefficient greater than 0.99 is allowed.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%).

All calibration criteria were within the control limits.

DATA REVIEW REPORT

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. Pesticide analysis requires that one of the two pesticide surrogate compounds exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries reported from the primary and confirmation column were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed using samples RB-02 and RB-DUP-01 exhibited recoveries and RPDs within the acceptance limits.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	All compounds	U	U	AC

Notes:

AC Acceptable

There were no pesticides detected in the parent sample RB-08 and field duplicate sample RB-DUP-01.

DATA REVIEW REPORT

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the percent difference (%D) of detected sample results must be less than 40%.

Sample locations associated with %D analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	%D
RB-10	Dieldrin	106%

The criteria used to evaluate the RPD are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit (RPD)	Qualification
>40% to 70%	J
>70% to 100%	JN
>100%	R
>100% to 200% (Interference detected)	J or JN
>50% (sample results less than the RL)	U

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PESTICIDES

PESTICIDES: SW-846 8081B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY (GC/ECD)					
Level II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Column RPD \leq 40%		X	X		
Dilution Factor		X		X	
Moisture Content		X		X	
Level III Validation					
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
System performance and column resolution		X		X	
Compound identification and quantitation					
A. Quantitation Reports		X		X	
B. RT of sample compounds within the established RT windows		X		X	
C. Identification/confirmation		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

DATA REVIEW REPORT

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

POLYCHLORINATED BIPHENYLS (PCBs) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8082A	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% is allowed or a correlation coefficient greater than 0.99.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%).

All Aroclors associated with calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

DATA REVIEW REPORT

Sample Locations	Initial/Continuing	Compound	Criteria
RB-01 RB-07 RB-08 RB-09 RB-10	Continuing Calibration %D	Aroclor 1260	+25.6%
RB-11 RB-12 RB-13 RB-14 RB-15		Aroclor 1260	+20.3%
RB-02 RB-03		Aroclor 1260	+21.6%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial Calibration	%RSD > 20% or a correlation coefficient < 0.99	Non-detect	UJ
		Detect	J
Continuing Calibration	%D > 20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D > 20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. PCB analysis requires that one of the two PCB surrogate compounds exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries reported from the primary and confirmation column were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

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The MS/MSD analysis was not performed using a sample from this SDG.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	All compounds	U	U	AC

Notes:

AC Acceptable

There were no PCBs detected in the parent sample RB-08 and field duplicate sample RB-DUP-01.

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the relative percent difference (%RPD) of detected sample results must be less than 40%.

There were no Aroclors detected in the field samples.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PCBs

PCBs: SW-846 8082A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY (GC/ECD)					
Level II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Column RPD \leq 40%	X				X
Dilution Factor		X		X	
Moisture Content		X		X	
Level III Validation					
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X	X		
System performance and column resolution		X		X	
Compound identification and quantitation					
A. Quantitation Reports		X		X	
B. RT of sample compounds within the established RT windows		X		X	
C. Pattern identification		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

DATA REVIEW REPORT

Notes:

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

DATA REVIEW REPORT

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION EXTRACTABLE PETROLEUM HYDROCARBON METHOD (NJDEP EPH) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
NJDEP EPH	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 25% or a correlation coefficient of greater than 0.99 is allowed.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (25%).

All initial and continuing calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

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Sample Locations	Initial/Continuing	Compound	Criteria
RB-09	Continuing Calibration %D	EPH (C9-C28)	-26.0%
RB-15		EPH (>C28-C40)	-29.2%
RB-DUP-01			

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial Calibration	%RSD > 25% or a correlation coefficient < 0.99	Non-detect	UJ
		Detect	J
Continuing Calibration	%D > 25% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D > 25% (decrease in sensitivity)	Non-detect	UJ
		Detect	J

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. The analysis requires surrogate compounds exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed using sample RB-05 exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

DATA REVIEW REPORT

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	All compounds	U	U	AC

Notes:

AC Acceptable

There were no EPHs detected in the parent sample RB-08 and field duplicate sample RB-DUP-01.

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows.

All identified compounds met the specified criteria.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR NJDEP EPH

NJDEP EPH	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY (GC/FID)					
Level II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Level III Validation					
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X	X		
System performance and column resolution		X		X	
Compound identification and quantitation					
A. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
C. Pattern identification		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

DATA REVIEW REPORT

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010D, 7471B, 7196A, 9012B, and 9045D; and ASTM D1498-76. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010D	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 7471B	Soil	28 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location RB-01 exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample RB-01. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	Barium	51.8	84.3	AC
	Cobalt	15.3	15.2	
	Lead	2.4	2.7	
	Potassium	1,120	1,120	
	Sodium	3,370	3,510	

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Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
	Zinc	22.1	24.8	
	Aluminum	25,200	26,100	3.5%
	Calcium	16,900	18,100	6.9%
	Chromium	60.0	77.8	25.8%
	Copper	76.2	71.8	5.9%
	Iron	11,700	13,600	15.0%
	Magnesium	7,240	8,360	14.4%
	Manganese	136	163	18.1%
	Nickel	23.2	24.8	6.7%
	Vanadium	40.2	42.4	5.3%

Notes:

AC = Acceptable

The differences in the metals results between the parent sample RB-08 and field duplicate sample RB-DUP-01 were in agreement.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from this SDG.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C/7471B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Cold Vapor Atomic Absorption (CVAA)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks	X				X
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

DATA REVIEW REPORT

The MS analysis performed on sample locations RB-01 and RB-DUP-01 exhibited recoveries within the control limits.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations RB-01 and RB-DUP-01 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations RB-DUP-01 exhibited results within the control limit.

The laboratory analysis performed on sample location RB-01 exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
RB-01	Hexavalent Chromium	$> \pm RL$

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result $>$ four times the RL	$> 20\%$	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result $<$ four times the RL	$\pm RL$	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	Hexavalent Chromium	0.40 U	0.49	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample RB-08 and field duplicate sample RB-DUP-01 was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks	X				X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Cyanide by SW846 9012B	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
RB-01	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
RB-02			
RB-03			
RB-04			
RB-05			
RB-06			
RB-07			
RB-08			
RB-09			
RB-10			
RB-11			
RB-12			
RB-13			
RB-14			
RB-15			
RB-DUP-01			

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

DATA REVIEW REPORT

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Cyanide was not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location RB-03 exhibited results within the control limit.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
RB-08 / RB-DUP-01	Redox Potential	206	323	44.2%
	pH	9.30	9.15	1.6%
	Cyanide	0.22 U	0.23 U	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample RB-08 and field duplicate sample RB-DUP-01 were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW846 9012B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 1, 2019

PEER REVIEW: Dennis Capria

DATE: October 3, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SOLL

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL. 732-329-0200 FAX: 732-329-3499/3490
www.sgs.com/ehsusa

L
CR

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes	
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		TAL/TCL +30 Hexavalent Chromium EPH PH										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Street Address: 10 Friends Lane		Street: 10 Chapel Ave													
City: Newton PA 18940		City: Jersey City NJ													
Project Contact: Krista Mastrocola		Project #: NP000270.3.8													
Phone #: 610.755.7000		Client Purchase Order #													
Sample(s) Name(s): Jim McLaughlin, Jr.		Project Manager: Jim McLaughlin													
Turn Around Time (Business Days)		Approved by (SGS PM) / Date:		Deliverable										Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days* <input type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input type="checkbox"/> EDD Format										Initial Assessment SB Label Verification JK	
* Approval needed for 1-3 Business Day TAT		* Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions	
Relinquished by: [Signature]		Date / Time: 4/12/19 14:15		Received By: Robert Dankous		Date / Time: 4/12/19 16:21		Relinquished by: [Signature]		Date / Time: 4/12/19		Received By: [Signature]		Date / Time: 4/12/19	
Relinquished by: [Signature]		Date / Time: 4/12/19 14:15		Received By: 3		Date / Time: 4/12/19		Relinquished by: [Signature]		Date / Time: 4/12/19		Received By: 4		Date / Time: 4/12/19	
Relinquished by: [Signature]		Date / Time: 4/12/19 14:15		Received By: 5		Date / Time: 4/12/19		Relinquished by: [Signature]		Date / Time: 4/12/19		Received By: 5		Date / Time: 4/12/19	
Custody Seal #		Intact		Not Intact		Preserved where applicable		Therm. ID:		On Ice		Cooler Temp. °C		J6 3.20C	

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx





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FED-EX Tracking #
Bottle Order Control #
SGS Quote # JC86307
SGS Job #

Client / Reporting Information
Company Name: Arcadis
Project Name: PPH Jersey City Site 107
Street Address: 10 Friends Lane, Newtown PA 18940
Project Contact: Krishna Mestrovcek
Phone #: 610.758.7080
Sampler(s) Name(s): Jim McLaughlin, Jr.
Project Manager: Jim McLaughlin, Jr.
Billing Information (if different from Report to)
Company Name
Street Address
City State Zip
Attention:
Collection
Number of preserved Bottles
Matrix Codes
LAB USE ONLY

Table with columns: SGS Sample #, Field ID / Point of Collection, MEQ/HD/VI Val #, Date, Time, Sampled by, Grab (G) Comp (C), Matrix, # of bottles, and various analysis codes (Pb, Ni, Cr, etc.). Rows 13-16 contain sample data.

Turn Around Time (Business Days)
Deliverable
Comments / Special Instructions: *ADDED TO COC
Approval needed for 1-3 Business Day TAT
Commercial "A" = Results only, Commercial "B" = Results + QC Summary, Commercial "C" = Results + QC Summary + Partial Raw data

Chain of Custody Log
Relinquished by: [Signature]
Received By: [Signature]
Date / Time: 4/16/19 14:00
Date / Time: 4/12/19 16:21
Date / Time: 4/12/19 14:12
Date / Time: 4/12/19 14:12
Date / Time: 4/12/19 14:12

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



5.2
5

Report of Analysis

Client Sample ID: RB-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-1	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	244		mv	1	04/15/19 19:15	JO	ASTM D1498-76M
Solids, Percent	99.2		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.35 J		su	1	04/15/19 19:15	JO	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: RB-02	Date Sampled: 04/12/19
Lab Sample ID: JC86307-2	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	197		mv	1	04/15/19 19:24	JO	ASTM D1498-76M
Solids, Percent	99.4		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.26 J		su	1	04/15/19 19:24	JO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: RB-03	Date Sampled: 04/12/19
Lab Sample ID: JC86307-3	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	232		mv	1	04/15/19 19:31	JO	ASTM D1498-76M
Solids, Percent	99.3		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.09 J		su	1	04/15/19 19:31	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-04	Date Sampled: 04/12/19
Lab Sample ID: JC86307-4	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	180		mv	1	04/15/19 19:39	JO	ASTM D1498-76M
Solids, Percent	99.6		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.33 J		su	1	04/15/19 19:39	JO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: RB-05	Date Sampled: 04/12/19
Lab Sample ID: JC86307-5	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.45 J	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	203		mv	1	04/15/19 19:45	JO	ASTM D1498-76M
Solids, Percent	99.5		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	8.75 J		su	1	04/15/19 19:45	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-06	Date Sampled: 04/12/19
Lab Sample ID: JC86307-6	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	203		mv	1	04/15/19 19:50	JO	ASTM D1498-76M
Solids, Percent	99.7		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.14 J		su	1	04/15/19 19:50	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-07	Date Sampled: 04/12/19
Lab Sample ID: JC86307-7	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	211		mv	1	04/15/19 20:01	JO	ASTM D1498-76M
Solids, Percent	99.5		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	8.95 J		su	1	04/15/19 20:01	JO	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: RB-08	Date Sampled: 04/12/19
Lab Sample ID: JC86307-8	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	206		mv	1	04/15/19 20:11	JO	ASTM D1498-76M
Solids, Percent	99.4		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.30 J		su	1	04/15/19 20:11	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-09	Date Sampled: 04/12/19
Lab Sample ID: JC86307-9	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	208		mv	1	04/15/19 20:17	JO	ASTM D1498-76M
Solids, Percent	99.6		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.08 J		su	1	04/15/19 20:17	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-10	Date Sampled: 04/12/19
Lab Sample ID: JC86307-10	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	214		mv	1	04/15/19 20:25	JO	ASTM D1498-76M
Solids, Percent	99		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.18 J		su	1	04/15/19 20:25	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-11	Date Sampled: 04/12/19
Lab Sample ID: JC86307-11	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98 J	0.40	mg/kg	1	04/17/19 13:36	RI	SW846 3060A/7196A
Redox Potential Vs H2	214		mv	1	04/15/19 20:31	JO	ASTM D1498-76M
Solids, Percent	99.5		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.08 J		su	1	04/15/19 20:31	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-12	Date Sampled: 04/12/19
Lab Sample ID: JC86307-12	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.40 J	0.40	mg/kg	1	04/17/19 13:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	222		mv	1	04/15/19 20:39	JO	ASTM D1498-76M
Solids, Percent	99.5		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.32 J		su	1	04/15/19 20:39	JO	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: RB-13	Date Sampled: 04/12/19
Lab Sample ID: JC86307-13	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61 J	0.40	mg/kg	1	04/17/19 13:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	217		mv	1	04/15/19 20:44	JO	ASTM D1498-76M
Solids, Percent	99.3		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.37 J		su	1	04/15/19 20:44	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J	0.40	mg/kg	1	04/17/19 13:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	211		mv	1	04/15/19 20:51	JO	ASTM D1498-76M
Solids, Percent	99.1		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.27 J		su	1	04/15/19 20:51	JO	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: RB-15	Date Sampled: 04/12/19
Lab Sample ID: JC86307-15	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.40 UJ	0.40	mg/kg	1	04/17/19 13:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	174		mv	1	04/15/19 20:58	JO	ASTM D1498-76M
Solids, Percent	99.6		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.40 J		su	1	04/15/19 20:58	JO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-DUP-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-16	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49	0.40	mg/kg	1	04/17/19 15:15	RI	SW846 3060A/7196A
Redox Potential Vs H2	323		mv	1	04/15/19 21:05	JO	ASTM D1498-76M
Solids, Percent	99.4		%	1	04/16/19 08:54	RC	SM2540 G 18TH ED MOD
pH	9.15 J		su	1	04/15/19 21:05	JO	SW846 9045D

RL = Reporting Limit

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Report of Analysis

Page 1 of 2

Client Sample ID: RB-01		
Lab Sample ID: JC86307-1A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225045.D	1	04/16/19 12:47	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	6.3 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.0	4.0	ug/kg	
71-43-2	Benzene	ND	0.40	0.30	ug/kg	
74-97-5	Bromochloromethane	ND	4.0	0.34	ug/kg	
75-27-4	Bromodichloromethane	ND	1.6	0.35	ug/kg	
75-25-2	Bromoform	ND	4.0	0.32	ug/kg	
74-83-9	Bromomethane	ND	4.0	0.80	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.0	3.0	ug/kg	
75-15-0	Carbon disulfide	ND	1.6	0.74	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.6	0.44	ug/kg	
108-90-7	Chlorobenzene	ND	1.6	0.28	ug/kg	
75-00-3	Chloroethane	ND	4.0	0.55	ug/kg	
67-66-3	Chloroform	ND	1.6	0.30	ug/kg	
74-87-3	Chloromethane	ND	4.0	1.6	ug/kg	
110-82-7	Cyclohexane	ND	1.6	0.32	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.6	0.67	ug/kg	
124-48-1	Dibromochloromethane	ND	1.6	0.27	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.80	0.26	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.80	0.24	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.80	0.29	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.80	0.28	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.0	0.51	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.80	0.31	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.80	0.38	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.80	0.52	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.80	0.77	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.80	0.53	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.6	0.33	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.6	0.28	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.6	0.26	ug/kg	
100-41-4	Ethylbenzene	ND	0.80	0.44	ug/kg	
76-13-1	Freon 113	ND	4.0	0.61	ug/kg	
591-78-6	2-Hexanone	ND	4.0	1.0	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-1A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.2
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.6	0.56	ug/kg	
79-20-9	Methyl Acetate	ND	4.0	1.1	ug/kg	
108-87-2	Methylcyclohexane	ND	1.6	0.57	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.80	0.28	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.0	1.2	ug/kg	
75-09-2	Methylene chloride	ND	4.0	2.0	ug/kg	
100-42-5	Styrene	ND	1.6	0.46	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.6	0.31	ug/kg	
127-18-4	Tetrachloroethene	ND	1.6	0.37	ug/kg	
108-88-3	Toluene	ND	0.80	0.30	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.0	0.80	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.0	0.80	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.6	0.34	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.6	0.27	ug/kg	
79-01-6	Trichloroethene	ND	0.80	0.61	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.0	0.54	ug/kg	
75-01-4	Vinyl chloride	ND	1.6	0.38	ug/kg	
	m,p-Xylene	ND	0.80	0.60	ug/kg	
95-47-6	o-Xylene	ND	0.80	0.47	ug/kg	
1330-20-7	Xylene (total)	ND	0.80	0.47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		75-127%
17060-07-0	1,2-Dichloroethane-D4	102%		75-130%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	97%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
124-19-6	Nonanal	17.78	4.8	ug/kg	JN
	Total TIC, Volatile		4.8	ug/kg	JN

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.1
4

Report of Analysis

Client Sample ID: RB-01		
Lab Sample ID: JC86307-1A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8270D SW846 3546		Percent Solids: 99.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58548.D	1	04/17/19 07:14	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-01	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-1A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.2
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	70%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-1A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.2
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	77%		27-114%
118-79-6	2,4,6-Tribromophenol	76%		19-152%
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	74%		39-124%
1718-51-0	Terphenyl-d14	83%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3100	ug/kg	JR
	unknown	10.85	200	ug/kg	JN
	Total TIC, Semi-Volatile		200	ug/kg	JN

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-1A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.2
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64237.D	1	04/16/19 12:41	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.63	0.52	ug/kg	
319-84-6	alpha-BHC	ND	0.63	0.51	ug/kg	
319-85-7	beta-BHC	ND	0.63	0.57	ug/kg	
319-86-8	delta-BHC	ND	0.63	0.60	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.63	0.46	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.63	0.51	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.63	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.63	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.63	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	0.63	0.57	ug/kg	
72-55-9	4,4'-DDE	ND	0.63	0.55	ug/kg	
50-29-3	4,4'-DDT	ND	0.63	0.55	ug/kg	
72-20-8	Endrin	ND	0.63	0.49	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.63	0.49	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.63	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.63	0.36	ug/kg	
33213-65-9	Endosulfan-II	ND	0.63	0.39	ug/kg	
76-44-8	Heptachlor	ND	0.63	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.63	0.44	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.50	ug/kg	
53494-70-5	Endrin ketone	ND	0.63	0.45	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	54%		25-135%
877-09-8	Tetrachloro-m-xylene	55%		25-135%
2051-24-3	Decachlorobiphenyl	57%		10-156%
2051-24-3	Decachlorobiphenyl	63%		10-156%

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N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID:	RB-01	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-1A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.2
Method:	SW846 8082A SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178500.D	1	04/16/19 18:45	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	15	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	24	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	28	ug/kg	
11097-69-1	Aroclor 1254	ND	31	17	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		31-146%
877-09-8	Tetrachloro-m-xylene	71%		31-146%
2051-24-3	Decachlorobiphenyl	83%		17-164%
2051-24-3	Decachlorobiphenyl	89%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	RB-01	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-1A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.2
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Y53416A.D	1	04/18/19 14:26	RK	04/18/19 09:30	OP19831	G5Y1830
Run #2							

	Initial Weight	Final Volume
Run #1	15.2 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.6	2.0	mg/kg	
	EPH (> C28-C40)	ND	6.6	2.0	mg/kg	
	Total EPH (C9-C40)	ND	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	67%		40-140%
3386-33-2	1-Chlorooctadecane	68%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-1A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	24600	48	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 1.9	1.9	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 1.9	1.9	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Barium	28.0	19	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.19	0.19	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.48	0.48	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	15800	480	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	39.9	0.97	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	19.0	4.8	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Copper	87.4	2.4	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Iron	18300	48	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.5	1.9	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	8090	480	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	175	1.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	26.1	3.9	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	993	970	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 1.9	1.9	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.48	0.48	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	3430	970	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.97	0.97	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	64.9	4.8	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	28.6	4.8	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46518

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-1A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 16:18	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-02		Date Sampled: 04/12/19
Lab Sample ID: JC86307-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225046.D	1	04/16/19 13:15	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.6 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.0	4.5	ug/kg	
71-43-2	Benzene	ND	0.45	0.34	ug/kg	
74-97-5	Bromochloromethane	ND	4.5	0.39	ug/kg	
75-27-4	Bromodichloromethane	ND	1.8	0.40	ug/kg	
75-25-2	Bromoform	ND	4.5	0.36	ug/kg	
74-83-9	Bromomethane	ND	4.5	0.89	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.0	3.4	ug/kg	
75-15-0	Carbon disulfide	ND	1.8	0.83	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.8	0.49	ug/kg	
108-90-7	Chlorobenzene	ND	1.8	0.32	ug/kg	
75-00-3	Chloroethane	ND	4.5	0.62	ug/kg	
67-66-3	Chloroform	ND	1.8	0.33	ug/kg	
74-87-3	Chloromethane	ND	4.5	1.8	ug/kg	
110-82-7	Cyclohexane	ND	1.8	0.36	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.8	0.75	ug/kg	
124-48-1	Dibromochloromethane	ND	1.8	0.30	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.90	0.29	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.90	0.27	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.90	0.32	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.90	0.31	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.5	0.57	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.90	0.35	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.90	0.42	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.90	0.59	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.90	0.86	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.90	0.60	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.8	0.37	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.8	0.32	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.8	0.29	ug/kg	
100-41-4	Ethylbenzene	ND	0.90	0.50	ug/kg	
76-13-1	Freon 113	ND	4.5	0.68	ug/kg	
591-78-6	2-Hexanone	ND	4.5	1.1	ug/kg	

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N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-02	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-2A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	SW846 8260C SW846 5035		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.8	0.63	ug/kg	
79-20-9	Methyl Acetate	ND	4.5	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.8	0.64	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.90	0.32	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.5	1.4	ug/kg	
75-09-2	Methylene chloride	ND	4.5	2.2	ug/kg	
100-42-5	Styrene	ND	1.8	0.52	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	0.35	ug/kg	
127-18-4	Tetrachloroethene	ND	1.8	0.41	ug/kg	
108-88-3	Toluene	ND	0.90	0.34	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.5	0.90	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.5	0.90	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.8	0.38	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.8	0.31	ug/kg	
79-01-6	Trichloroethene	ND	0.90	0.68	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.5	0.61	ug/kg	
75-01-4	Vinyl chloride	ND	1.8	0.42	ug/kg	
	m,p-Xylene	ND	0.90	0.67	ug/kg	
95-47-6	o-Xylene	ND	0.90	0.52	ug/kg	
1330-20-7	Xylene (total)	ND	0.90	0.52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		75-127%
17060-07-0	1,2-Dichloroethane-D4	90%		75-130%
2037-26-5	Toluene-D8	101%		80-120%
460-00-4	4-Bromofluorobenzene	99%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-02		
Lab Sample ID: JC86307-2A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8270D SW846 3546		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58549.D	1	04/17/19 07:38	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	340	90	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	18	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	ND	34	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	34	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	34	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-02	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-2A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	34	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	34	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	34	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	34	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	34	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.4	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	34	15	ug/kg	
86-73-7	Fluorene	ND	34	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND	34	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	340	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	34	16	ug/kg	
78-59-1	Isophorone	ND	67	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	34	7.6	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.7	ug/kg	
91-20-3	Naphthalene	ND	34	9.5	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.7	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	34	11	ug/kg	
129-00-0	Pyrene	ND	34	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-02		Date Sampled: 04/12/19
Lab Sample ID: JC86307-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	67%		27-114%
118-79-6	2,4,6-Tribromophenol	62%		19-152%
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.10	2800	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.2
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Report of Analysis

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Client Sample ID: RB-02		Date Sampled: 04/12/19
Lab Sample ID: JC86307-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	8G22831.D	1	04/17/19 17:51	MH	04/16/19 12:00	OP19785	G8G773
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.2 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.66	0.55	ug/kg	
319-84-6	alpha-BHC	ND	0.66	0.54	ug/kg	
319-85-7	beta-BHC	ND	0.66	0.60	ug/kg	
319-86-8	delta-BHC	ND	0.66	0.64	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.66	0.49	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.66	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.66	0.30	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.66	0.30	ug/kg	
60-57-1	Dieldrin	ND	0.66	0.45	ug/kg	
72-54-8	4,4'-DDD	ND	0.66	0.61	ug/kg	
72-55-9	4,4'-DDE	ND	0.66	0.58	ug/kg	
50-29-3	4,4'-DDT	ND	0.66	0.59	ug/kg	
72-20-8	Endrin	ND	0.66	0.51	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.66	0.52	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.66	0.38	ug/kg	
959-98-8	Endosulfan-I	ND	0.66	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	0.66	0.41	ug/kg	
76-44-8	Heptachlor	ND	0.66	0.57	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.66	0.46	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.53	ug/kg	
53494-70-5	Endrin ketone	ND	0.66	0.48	ug/kg	
8001-35-2	Toxaphene	ND	17	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	49%		25-135%
877-09-8	Tetrachloro-m-xylene	50%		25-135%
2051-24-3	Decachlorobiphenyl	51%		10-156%
2051-24-3	Decachlorobiphenyl	54%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID:	RB-02	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-2A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	SW846 8082A SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178525.D	1	04/17/19 01:47	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	33	15	ug/kg	
11104-28-2	Aroclor 1221	ND	33	17	ug/kg	
11141-16-5	Aroclor 1232	ND	33	25	ug/kg	
53469-21-9	Aroclor 1242	ND	33	14	ug/kg	
12672-29-6	Aroclor 1248	ND	33	30	ug/kg	
11097-69-1	Aroclor 1254	ND	33	18	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	33	14	ug/kg	
11100-14-4	Aroclor 1268	ND	33	14	ug/kg	
37324-23-5	Aroclor 1262	ND	33	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	62%		31-146%
877-09-8	Tetrachloro-m-xylene	63%		31-146%
2051-24-3	Decachlorobiphenyl	67%		17-164%
2051-24-3	Decachlorobiphenyl	68%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-02		
Lab Sample ID: JC86307-2A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Y53417.D	1	04/18/19 15:01	RK	04/18/19 09:30	OP19831	G5Y1830
Run #2							

	Initial Weight	Final Volume
Run #1	15.2 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.6	2.0	mg/kg	
	EPH (> C28-C40)	ND	6.6	2.0	mg/kg	
	Total EPH (C9-C40)	ND	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	67%		40-140%
3386-33-2	1-Chlorooctadecane	68%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-02		Date Sampled: 04/12/19
Lab Sample ID: JC86307-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	18000	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Barium	26.1	20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	12300	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	44.0	1.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	11.2	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Copper	66.4	2.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Iron	10300	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Lead	3.2	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	5820	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	111	1.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	19.9	4.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	< 1000	1000	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	2400	1000	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	30.2	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	23.9	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46518

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: RB-02		Date Sampled: 04/12/19
Lab Sample ID: JC86307-2A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 15:55	KI	SW846 9012B/LACHAT

RL = Reporting Limit

4.2
4

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Report of Analysis

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Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225047.D	1	04/16/19 13:44	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.0 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10	5.0	ug/kg	
71-43-2	Benzene	ND	0.50	0.38	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.43	ug/kg	
75-27-4	Bromodichloromethane	ND	2.0	0.45	ug/kg	
75-25-2	Bromoform	ND	5.0	0.41	ug/kg	
74-83-9	Bromomethane	ND	5.0	1.0	ug/kg	
78-93-3	2-Butanone (MEK)	ND	10	3.8	ug/kg	
75-15-0	Carbon disulfide	ND	2.0	0.94	ug/kg	
56-23-5	Carbon tetrachloride	ND	2.0	0.55	ug/kg	
108-90-7	Chlorobenzene	ND	2.0	0.36	ug/kg	
75-00-3	Chloroethane	ND	5.0	0.69	ug/kg	
67-66-3	Chloroform	ND	2.0	0.37	ug/kg	
74-87-3	Chloromethane	ND	5.0	2.0	ug/kg	
110-82-7	Cyclohexane	ND	2.0	0.41	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.84	ug/kg	
124-48-1	Dibromochloromethane	ND	2.0	0.34	ug/kg	
106-93-4	1,2-Dibromoethane	ND	1.0	0.33	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1.0	0.31	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1.0	0.36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1.0	0.35	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	0.64	ug/kg	
75-34-3	1,1-Dichloroethane	ND	1.0	0.39	ug/kg	
107-06-2	1,2-Dichloroethane	ND	1.0	0.47	ug/kg	
75-35-4	1,1-Dichloroethene	ND	1.0	0.66	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	0.96	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	0.67	ug/kg	
78-87-5	1,2-Dichloropropane	ND	2.0	0.41	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	2.0	0.35	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	2.0	0.33	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	0.56	ug/kg	
76-13-1	Freon 113	ND	5.0	0.77	ug/kg	
591-78-6	2-Hexanone	ND	5.0	1.3	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	2.0	0.70	ug/kg	
79-20-9	Methyl Acetate	ND	5.0	1.4	ug/kg	
108-87-2	Methylcyclohexane	ND	2.0	0.71	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.35	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	5.0	1.6	ug/kg	
75-09-2	Methylene chloride	ND	5.0	2.5	ug/kg	
100-42-5	Styrene	ND	2.0	0.58	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	0.39	ug/kg	
127-18-4	Tetrachloroethene	ND	2.0	0.47	ug/kg	
108-88-3	Toluene	ND	1.0	0.38	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	2.0	0.43	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	2.0	0.34	ug/kg	
79-01-6	Trichloroethene	ND	1.0	0.77	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	0.69	ug/kg	
75-01-4	Vinyl chloride	ND	2.0	0.47	ug/kg	
	m,p-Xylene	ND	1.0	0.75	ug/kg	
95-47-6	o-Xylene	ND	1.0	0.59	ug/kg	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		75-127%
17060-07-0	1,2-Dichloroethane-D4	91%		75-130%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	102%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.3
4

Report of Analysis

Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58550.D	1	04/17/19 08:03	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	65	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	58	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	65	21	ug/kg	
	3&4-Methylphenol	ND	65	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	87	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	65	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	24	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	19	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.0	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	65	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	65	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	65	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	65	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.1	ug/kg	
91-58-7	2-Chloronaphthalene	ND	65	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	65	4.7	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	65	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	65	7.0	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	65	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	65	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	65	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	16	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	65	27	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	14	ug/kg	
132-64-9	Dibenzofuran	ND	65	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	65	5.3	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	65	8.1	ug/kg	
84-66-2	Diethyl phthalate	ND	65	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	65	5.8	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	65	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	65	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	65	7.0	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.4	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.7	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.2	ug/kg	
98-95-3	Nitrobenzene	ND	65	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	65	9.4	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	10	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	62%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-03 Lab Sample ID: JC86307-3A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/12/19 Date Received: 04/12/19 Percent Solids: 99.3
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	65%		27-114%
118-79-6	2,4,6-Tribromophenol	67%		19-152%
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	66%		39-124%
1718-51-0	Terphenyl-d14	76%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.00	2800	ug/kg	J-R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.3
4

Report of Analysis

Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	8G22834.D	1	04/17/19 18:41	MH	04/16/19 12:00	OP19785	G8G773
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.66	0.54	ug/kg	
319-84-6	alpha-BHC	ND	0.66	0.54	ug/kg	
319-85-7	beta-BHC	ND	0.66	0.60	ug/kg	
319-86-8	delta-BHC	ND	0.66	0.63	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.66	0.49	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.66	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.66	0.30	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.66	0.30	ug/kg	
60-57-1	Dieldrin	ND	0.66	0.45	ug/kg	
72-54-8	4,4'-DDD	ND	0.66	0.60	ug/kg	
72-55-9	4,4'-DDE	ND	0.66	0.58	ug/kg	
50-29-3	4,4'-DDT	ND	0.66	0.58	ug/kg	
72-20-8	Endrin	ND	0.66	0.51	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.66	0.51	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.66	0.37	ug/kg	
959-98-8	Endosulfan-I	ND	0.66	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	0.66	0.41	ug/kg	
76-44-8	Heptachlor	ND	0.66	0.57	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.66	0.46	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.52	ug/kg	
53494-70-5	Endrin ketone	ND	0.66	0.48	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	83%		25-135%
877-09-8	Tetrachloro-m-xylene	80%		25-135%
2051-24-3	Decachlorobiphenyl	79%		10-156%
2051-24-3	Decachlorobiphenyl	91%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-03		
Lab Sample ID: JC86307-3A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178526.D	1	04/17/19 02:04	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	33	15	ug/kg	
11104-28-2	Aroclor 1221	ND	33	17	ug/kg	
11141-16-5	Aroclor 1232	ND	33	25	ug/kg	
53469-21-9	Aroclor 1242	ND	33	13	ug/kg	
12672-29-6	Aroclor 1248	ND	33	29	ug/kg	
11097-69-1	Aroclor 1254	ND	33	18	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	33	14	ug/kg	
11100-14-4	Aroclor 1268	ND	33	14	ug/kg	
37324-23-5	Aroclor 1262	ND	33	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	102%		31-146%
877-09-8	Tetrachloro-m-xylene	104%		31-146%
2051-24-3	Decachlorobiphenyl	111%		17-164%
2051-24-3	Decachlorobiphenyl	133%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-03		
Lab Sample ID: JC86307-3A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Y53418.D	1	04/18/19 15:36	RK	04/18/19 09:30	OP19831	G5Y1830
Run #2							

	Initial Weight	Final Volume
Run #1	16.7 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.0	1.8	mg/kg	
	EPH (> C28-C40)	ND	6.0	1.8	mg/kg	
	Total EPH (C9-C40)	ND	6.0	1.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	61%		40-140%
3386-33-2	1-Chlorooctadecane	63%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-03		Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	20000	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Barium	30.7	20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	13400	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	49.6	1.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	15.3	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Copper	83.4	2.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Iron	14900	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.6	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	6790	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	141	1.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.029	0.029	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	23.1	4.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	< 1000	1000	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	2700	1000	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	51.8	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	25.2	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46518

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: RB-03	Date Sampled: 04/12/19
Lab Sample ID: JC86307-3A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.22	0.22	mg/kg	1	04/17/19 15:56	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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4

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Report of Analysis

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Client Sample ID: RB-04		
Lab Sample ID: JC86307-4A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225050.D	1	04/16/19 15:08	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.2 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.7	4.8	ug/kg	
71-43-2	Benzene	ND	0.48	0.36	ug/kg	
74-97-5	Bromochloromethane	ND	4.8	0.42	ug/kg	
75-27-4	Bromodichloromethane	ND	1.9	0.43	ug/kg	
75-25-2	Bromoform	ND	4.8	0.39	ug/kg	
74-83-9	Bromomethane	ND	4.8	0.96	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.7	3.6	ug/kg	
75-15-0	Carbon disulfide	ND	1.9	0.90	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.9	0.53	ug/kg	
108-90-7	Chlorobenzene	ND	1.9	0.34	ug/kg	
75-00-3	Chloroethane	ND	4.8	0.66	ug/kg	
67-66-3	Chloroform	ND	1.9	0.36	ug/kg	
74-87-3	Chloromethane	ND	4.8	1.9	ug/kg	
110-82-7	Cyclohexane	ND	1.9	0.39	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.9	0.81	ug/kg	
124-48-1	Dibromochloromethane	ND	1.9	0.33	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.97	0.31	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.97	0.29	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.97	0.35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.97	0.33	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.8	0.61	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.97	0.37	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.97	0.45	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.97	0.63	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.97	0.92	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.97	0.64	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.9	0.39	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.9	0.34	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.9	0.32	ug/kg	
100-41-4	Ethylbenzene	ND	0.97	0.53	ug/kg	
76-13-1	Freon 113	ND	4.8	0.74	ug/kg	
591-78-6	2-Hexanone	ND	4.8	1.2	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-04		Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.9	0.67	ug/kg	
79-20-9	Methyl Acetate	ND	4.8	1.3	ug/kg	
108-87-2	Methylcyclohexane	ND	1.9	0.68	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.97	0.34	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.8	1.5	ug/kg	
75-09-2	Methylene chloride	ND	4.8	2.4	ug/kg	
100-42-5	Styrene	ND	1.9	0.56	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	0.38	ug/kg	
127-18-4	Tetrachloroethene	ND	1.9	0.45	ug/kg	
108-88-3	Toluene	ND	0.97	0.36	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.8	0.97	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.8	0.97	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.9	0.41	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.9	0.33	ug/kg	
79-01-6	Trichloroethene	ND	0.97	0.74	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.8	0.66	ug/kg	
75-01-4	Vinyl chloride	ND	1.9	0.45	ug/kg	
	m,p-Xylene	ND	0.97	0.72	ug/kg	
95-47-6	o-Xylene	ND	0.97	0.56	ug/kg	
1330-20-7	Xylene (total)	ND	0.97	0.56	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		75-127%
17060-07-0	1,2-Dichloroethane-D4	99%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	100%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.4
4

Report of Analysis

Client Sample ID: RB-04		
Lab Sample ID: JC86307-4A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8270D SW846 3546		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58551.D	1	04/17/19 08:27	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	12	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	21	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-04		Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.6	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.7	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.7	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-04		Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	67%		27-114%
118-79-6	2,4,6-Tribromophenol	66%		19-152%
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	67%		39-124%
1718-51-0	Terphenyl-d14	75%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3000	ug/kg	J-R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.4
4

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Report of Analysis

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Client Sample ID: RB-04		Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	8G22835.D	1	04/17/19 18:58	MH	04/16/19 12:00	OP19785	G8G773
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.9 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.63	0.52	ug/kg	
319-84-6	alpha-BHC	ND	0.63	0.51	ug/kg	
319-85-7	beta-BHC	ND	0.63	0.57	ug/kg	
319-86-8	delta-BHC	ND	0.63	0.61	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.63	0.47	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.63	0.51	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.63	0.29	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.63	0.29	ug/kg	
60-57-1	Dieldrin	ND	0.63	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	0.63	0.58	ug/kg	
72-55-9	4,4'-DDE	ND	0.63	0.55	ug/kg	
50-29-3	4,4'-DDT	ND	0.63	0.56	ug/kg	
72-20-8	Endrin	ND	0.63	0.49	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.63	0.49	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.63	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.63	0.36	ug/kg	
33213-65-9	Endosulfan-II	ND	0.63	0.39	ug/kg	
76-44-8	Heptachlor	ND	0.63	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.63	0.44	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.50	ug/kg	
53494-70-5	Endrin ketone	ND	0.63	0.46	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	43%		25-135%
877-09-8	Tetrachloro-m-xylene	41%		25-135%
2051-24-3	Decachlorobiphenyl	43%		10-156%
2051-24-3	Decachlorobiphenyl	43%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-04		
Lab Sample ID: JC86307-4A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178531.D	1	04/17/19 03:29	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	32	15	ug/kg	
11104-28-2	Aroclor 1221	ND	32	16	ug/kg	
11141-16-5	Aroclor 1232	ND	32	24	ug/kg	
53469-21-9	Aroclor 1242	ND	32	13	ug/kg	
12672-29-6	Aroclor 1248	ND	32	28	ug/kg	
11097-69-1	Aroclor 1254	ND	32	17	ug/kg	
11096-82-5	Aroclor 1260	ND	32	13	ug/kg	
11100-14-4	Aroclor 1268	ND	32	13	ug/kg	
37324-23-5	Aroclor 1262	ND	32	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	59%		31-146%
877-09-8	Tetrachloro-m-xylene	61%		31-146%
2051-24-3	Decachlorobiphenyl	71%		17-164%
2051-24-3	Decachlorobiphenyl	98%		17-164%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

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B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-04		
Lab Sample ID: JC86307-4A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61674.D	1	04/18/19 15:01	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

	Initial Weight	Final Volume
Run #1	15.5 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.5	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.5	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.5	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	86%		40-140%
3386-33-2	1-Chlorooctadecane	90%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-04		Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	20300	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Barium	47.5	20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	14100	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	39.5	0.99	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	11.5	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Copper	58.8	2.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Iron	8790	50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	5740	500	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	108	1.5	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	18.3	4.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	< 990	990	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	2760	990	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.99	0.99	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	24.6	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	18.4	5.0	mg/kg	1	04/15/19	04/16/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46518

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.4
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Report of Analysis

Client Sample ID: RB-04	Date Sampled: 04/12/19
Lab Sample ID: JC86307-4A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 15:58	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-05		
Lab Sample ID: JC86307-5A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225052.D	1	04/16/19 16:48	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.2 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.7	4.8	ug/kg	
71-43-2	Benzene	ND	0.48	0.36	ug/kg	
74-97-5	Bromochloromethane	ND	4.8	0.42	ug/kg	
75-27-4	Bromodichloromethane	ND	1.9	0.43	ug/kg	
75-25-2	Bromoform	ND	4.8	0.39	ug/kg	
74-83-9	Bromomethane	ND	4.8	0.96	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.7	3.6	ug/kg	
75-15-0	Carbon disulfide	ND	1.9	0.90	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.9	0.53	ug/kg	
108-90-7	Chlorobenzene	ND	1.9	0.34	ug/kg	
75-00-3	Chloroethane	ND	4.8	0.66	ug/kg	
67-66-3	Chloroform	ND	1.9	0.36	ug/kg	
74-87-3	Chloromethane	ND	4.8	1.9	ug/kg	
110-82-7	Cyclohexane	ND	1.9	0.39	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.9	0.81	ug/kg	
124-48-1	Dibromochloromethane	ND	1.9	0.33	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.97	0.31	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.97	0.29	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.97	0.35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.97	0.33	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.8	0.61	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.97	0.37	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.97	0.45	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.97	0.63	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.97	0.92	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.97	0.64	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.9	0.39	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.9	0.34	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.9	0.32	ug/kg	
100-41-4	Ethylbenzene	ND	0.97	0.53	ug/kg	
76-13-1	Freon 113	ND	4.8	0.74	ug/kg	
591-78-6	2-Hexanone	ND	4.8	1.2	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-05		Date Sampled: 04/12/19
Lab Sample ID: JC86307-5A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.9	0.67	ug/kg	
79-20-9	Methyl Acetate	ND	4.8	1.3	ug/kg	
108-87-2	Methylcyclohexane	ND	1.9	0.68	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.97	0.34	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.8	1.5	ug/kg	
75-09-2	Methylene chloride	ND	4.8	2.4	ug/kg	
100-42-5	Styrene	ND	1.9	0.56	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	0.38	ug/kg	
127-18-4	Tetrachloroethene	ND	1.9	0.45	ug/kg	
108-88-3	Toluene	ND	0.97	0.36	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.8	0.97	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.8	0.97	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.9	0.41	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.9	0.33	ug/kg	
79-01-6	Trichloroethene	ND	0.97	0.74	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.8	0.66	ug/kg	
75-01-4	Vinyl chloride	ND	1.9	0.45	ug/kg	
	m,p-Xylene	ND	0.97	0.72	ug/kg	
95-47-6	o-Xylene	ND	0.97	0.56	ug/kg	
1330-20-7	Xylene (total)	ND	0.97	0.56	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		75-127%
17060-07-0	1,2-Dichloroethane-D4	101%		75-130%
2037-26-5	Toluene-D8	102%		80-120%
460-00-4	4-Bromofluorobenzene	95%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-05		Date Sampled: 04/12/19
Lab Sample ID: JC86307-5A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58552.D	1	04/17/19 08:51	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	66	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-05	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-5A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	66	27	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.4	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.5	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	60%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-05 Lab Sample ID: JC86307-5A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/12/19 Date Received: 04/12/19 Percent Solids: 99.5
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	66%		27-114%
118-79-6	2,4,6-Tribromophenol	63%		19-152%
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	2800	ug/kg	J R
	system artifact/aldol-condensation	2.48	500	ug/kg	J N
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.5
4

Report of Analysis

Client Sample ID: RB-05		Date Sampled: 04/12/19
Lab Sample ID: JC86307-5A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	8G22836.D	1	04/17/19 19:14	MH	04/16/19 12:00	OP19785	G8G773
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.8 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.64	0.52	ug/kg	
319-84-6	alpha-BHC	ND	0.64	0.52	ug/kg	
319-85-7	beta-BHC	ND	0.64	0.58	ug/kg	
319-86-8	delta-BHC	ND	0.64	0.61	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.64	0.47	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.64	0.51	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.64	0.29	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.64	0.29	ug/kg	
60-57-1	Dieldrin	ND	0.64	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	0.64	0.58	ug/kg	
72-55-9	4,4'-DDE	ND	0.64	0.56	ug/kg	
50-29-3	4,4'-DDT	ND	0.64	0.56	ug/kg	
72-20-8	Endrin	ND	0.64	0.49	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.64	0.50	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.64	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.64	0.37	ug/kg	
33213-65-9	Endosulfan-II	ND	0.64	0.40	ug/kg	
76-44-8	Heptachlor	ND	0.64	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.64	0.45	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.51	ug/kg	
53494-70-5	Endrin ketone	ND	0.64	0.46	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	45%		25-135%
877-09-8	Tetrachloro-m-xylene	44%		25-135%
2051-24-3	Decachlorobiphenyl	43%		10-156%
2051-24-3	Decachlorobiphenyl	54%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-05		
Lab Sample ID: JC86307-5A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178532.D	1	04/17/19 03:46	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	32	15	ug/kg	
11104-28-2	Aroclor 1221	ND	32	16	ug/kg	
11141-16-5	Aroclor 1232	ND	32	24	ug/kg	
53469-21-9	Aroclor 1242	ND	32	13	ug/kg	
12672-29-6	Aroclor 1248	ND	32	28	ug/kg	
11097-69-1	Aroclor 1254	ND	32	17	ug/kg	
11096-82-5	Aroclor 1260	ND	32	14	ug/kg	
11100-14-4	Aroclor 1268	ND	32	13	ug/kg	
37324-23-5	Aroclor 1262	ND	32	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	55%		31-146%
877-09-8	Tetrachloro-m-xylene	56%		31-146%
2051-24-3	Decachlorobiphenyl	63%		17-164%
2051-24-3	Decachlorobiphenyl	70%		17-164%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

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B = Indicates analyte found in associated method blank

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-05		
Lab Sample ID: JC86307-5A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Z53415A.D	1	04/18/19 13:51	RK	04/18/19 09:30	OP19831	G5Z1614
Run #2							

	Initial Weight	Final Volume
Run #1	15.7 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.4	1.9	mg/kg	
	EPH (> C28-C40)	11.9	6.4	1.9	mg/kg	
	Total EPH (C9-C40)	11.9	6.4	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	59%		40-140%
3386-33-2	1-Chlorooctadecane	61%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-05	Date Sampled: 04/12/19
Lab Sample ID: JC86307-5A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	18500	51	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Antimony	< 2.1	2.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Arsenic ^a	< 4.1	4.1	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Barium	37.7	21	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Beryllium	< 0.21	0.21	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Cadmium	< 0.51	0.51	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Calcium	11900	510	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Chromium	9.9	1.0	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Cobalt	18.0	5.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Copper ^a	118	5.1	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Iron	22200	100	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Lead	4.2	2.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Magnesium	4890	510	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Manganese ^a	208	3.1	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁵
Nickel	17.2	4.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Potassium	1170	1000	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Selenium ^a	< 4.1	4.1	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Silver ^a	< 1.0	1.0	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Sodium	2580	1000	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Thallium ^a	< 2.1	2.1	mg/kg	2	04/15/19	04/17/19	ND SW846 6010D ³	SW846 3050B ⁴
Vanadium	91.1	5.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴
Zinc	36.0	5.1	mg/kg	1	04/15/19	04/16/19	ND SW846 6010D ²	SW846 3050B ⁴

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46518

(3) Instrument QC Batch: MA46524

(4) Prep QC Batch: MP14240

(5) Prep QC Batch: MP14255

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-05	Date Sampled: 04/12/19
Lab Sample ID: JC86307-5A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 15:59	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-06		
Lab Sample ID: JC86307-6A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225053.D	1	04/16/19 17:16	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.9 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.5	4.3	ug/kg	
71-43-2	Benzene	ND	0.43	0.32	ug/kg	
74-97-5	Bromochloromethane	ND	4.3	0.37	ug/kg	
75-27-4	Bromodichloromethane	ND	1.7	0.38	ug/kg	
75-25-2	Bromoform	ND	4.3	0.34	ug/kg	
74-83-9	Bromomethane	ND	4.3	0.85	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.5	3.2	ug/kg	
75-15-0	Carbon disulfide	ND	1.7	0.79	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.7	0.47	ug/kg	
108-90-7	Chlorobenzene	ND	1.7	0.30	ug/kg	
75-00-3	Chloroethane	ND	4.3	0.58	ug/kg	
67-66-3	Chloroform	ND	1.7	0.32	ug/kg	
74-87-3	Chloromethane	ND	4.3	1.7	ug/kg	
110-82-7	Cyclohexane	ND	1.7	0.35	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.7	0.71	ug/kg	
124-48-1	Dibromochloromethane	ND	1.7	0.29	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.85	0.28	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.85	0.26	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.85	0.31	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.85	0.29	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.3	0.54	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.85	0.33	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.85	0.40	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.85	0.56	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.85	0.81	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.85	0.57	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.7	0.35	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.7	0.30	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.7	0.28	ug/kg	
100-41-4	Ethylbenzene	ND	0.85	0.47	ug/kg	
76-13-1	Freon 113	ND	4.3	0.65	ug/kg	
591-78-6	2-Hexanone	ND	4.3	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.7	0.59	ug/kg	
79-20-9	Methyl Acetate	ND	4.3	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.7	0.60	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.85	0.30	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.3	1.3	ug/kg	
75-09-2	Methylene chloride	ND	4.3	2.1	ug/kg	
100-42-5	Styrene	ND	1.7	0.49	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.7	0.33	ug/kg	
127-18-4	Tetrachloroethene	ND	1.7	0.39	ug/kg	
108-88-3	Toluene	ND	0.85	0.32	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.3	0.85	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.3	0.85	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.7	0.36	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.7	0.29	ug/kg	
79-01-6	Trichloroethene	ND	0.85	0.65	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.3	0.58	ug/kg	
75-01-4	Vinyl chloride	ND	1.7	0.40	ug/kg	
	m,p-Xylene	ND	0.85	0.63	ug/kg	
95-47-6	o-Xylene	ND	0.85	0.50	ug/kg	
1330-20-7	Xylene (total)	ND	0.85	0.50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		75-127%
17060-07-0	1,2-Dichloroethane-D4	100%		75-130%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	98%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.6
4

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58553.D	1	04/17/19 09:16	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	66	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	66	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	70%		27-114%
118-79-6	2,4,6-Tribromophenol	68%		19-152%
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	77%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	2900	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.6
4

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	8G22837.D	1	04/17/19 19:30	MH	04/16/19 12:00	OP19785	G8G773
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.61	0.50	ug/kg	
319-84-6	alpha-BHC	ND	0.61	0.50	ug/kg	
319-85-7	beta-BHC	ND	0.61	0.55	ug/kg	
319-86-8	delta-BHC	ND	0.61	0.59	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.61	0.45	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.61	0.49	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.61	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.61	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.61	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	0.61	0.56	ug/kg	
72-55-9	4,4'-DDE	ND	0.61	0.54	ug/kg	
50-29-3	4,4'-DDT	ND	0.61	0.54	ug/kg	
72-20-8	Endrin	ND	0.61	0.48	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.61	0.48	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.61	0.35	ug/kg	
959-98-8	Endosulfan-I	ND	0.61	0.35	ug/kg	
33213-65-9	Endosulfan-II	ND	0.61	0.38	ug/kg	
76-44-8	Heptachlor	ND	0.61	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.61	0.43	ug/kg	
72-43-5	Methoxychlor	ND	1.2	0.49	ug/kg	
53494-70-5	Endrin ketone	ND	0.61	0.44	ug/kg	
8001-35-2	Toxaphene	ND	15	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	58%		25-135%
877-09-8	Tetrachloro-m-xylene	58%		25-135%
2051-24-3	Decachlorobiphenyl	55%		10-156%
2051-24-3	Decachlorobiphenyl	57%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

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N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-06		
Lab Sample ID: JC86307-6A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178533.D	1	04/17/19 04:03	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	14	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	23	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	27	ug/kg	
11097-69-1	Aroclor 1254	ND	31	16	ug/kg	
11096-82-5	Aroclor 1260	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		31-146%
877-09-8	Tetrachloro-m-xylene	76%		31-146%
2051-24-3	Decachlorobiphenyl	84%		17-164%
2051-24-3	Decachlorobiphenyl	93%		17-164%

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-06		
Lab Sample ID: JC86307-6A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Z53416A.D	1	04/18/19 14:26	RK	04/18/19 09:30	OP19831	G5Z1614
Run #2							

	Initial Weight	Final Volume
Run #1	15.3 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.6	2.0	mg/kg	
	EPH (> C28-C40)	ND	6.6	2.0	mg/kg	
	Total EPH (C9-C40)	ND	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	63%		40-140%
3386-33-2	1-Chlorooctadecane	70%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-06		Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	28900	50	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	41.8	20	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	18800	500	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	75.7	0.99	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	16.8	5.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	78.6	2.5	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	13800	50	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.6	2.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	8380	500	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	163	1.5	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	26.8	4.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	1710	990	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	4140	990	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.99	0.99	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	39.7	5.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	62.2	5.0	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14242

(4) Prep QC Batch: MP14255

RL = Reporting Limit

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Report of Analysis

Client Sample ID: RB-06	Date Sampled: 04/12/19
Lab Sample ID: JC86307-6A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.25	0.25	mg/kg	1	04/17/19 16:00	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-07		
Lab Sample ID: JC86307-7A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225054.D	1	04/16/19 17:44	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.9 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.5	4.3	ug/kg	
71-43-2	Benzene	ND	0.43	0.32	ug/kg	
74-97-5	Bromochloromethane	ND	4.3	0.37	ug/kg	
75-27-4	Bromodichloromethane	ND	1.7	0.38	ug/kg	
75-25-2	Bromoform	ND	4.3	0.34	ug/kg	
74-83-9	Bromomethane	ND	4.3	0.85	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.5	3.2	ug/kg	
75-15-0	Carbon disulfide	ND	1.7	0.79	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.7	0.47	ug/kg	
108-90-7	Chlorobenzene	ND	1.7	0.30	ug/kg	
75-00-3	Chloroethane	ND	4.3	0.59	ug/kg	
67-66-3	Chloroform	ND	1.7	0.32	ug/kg	
74-87-3	Chloromethane	ND	4.3	1.7	ug/kg	
110-82-7	Cyclohexane	ND	1.7	0.35	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.7	0.71	ug/kg	
124-48-1	Dibromochloromethane	ND	1.7	0.29	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.85	0.28	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.85	0.26	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.85	0.31	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.85	0.29	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.3	0.54	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.85	0.33	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.85	0.40	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.85	0.56	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.85	0.82	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.85	0.57	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.7	0.35	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.7	0.30	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.7	0.28	ug/kg	
100-41-4	Ethylbenzene	ND	0.85	0.47	ug/kg	
76-13-1	Freon 113	ND	4.3	0.65	ug/kg	
591-78-6	2-Hexanone	ND	4.3	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-07		Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.7	0.59	ug/kg	
79-20-9	Methyl Acetate	ND	4.3	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.7	0.60	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.85	0.30	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.3	1.3	ug/kg	
75-09-2	Methylene chloride	ND	4.3	2.1	ug/kg	
100-42-5	Styrene	ND	1.7	0.49	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.7	0.33	ug/kg	
127-18-4	Tetrachloroethene	ND	1.7	0.39	ug/kg	
108-88-3	Toluene	ND	0.85	0.32	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.3	0.85	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.3	0.85	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.7	0.36	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.7	0.29	ug/kg	
79-01-6	Trichloroethene	ND	0.85	0.65	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.3	0.58	ug/kg	
75-01-4	Vinyl chloride	ND	1.7	0.40	ug/kg	
	m,p-Xylene	ND	0.85	0.64	ug/kg	
95-47-6	o-Xylene	ND	0.85	0.50	ug/kg	
1330-20-7	Xylene (total)	ND	0.85	0.50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		75-127%
17060-07-0	1,2-Dichloroethane-D4	98%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	99%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-07		Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58554.D	1	04/17/19 09:40	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-07	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-7A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-07		Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	73%		27-114%
118-79-6	2,4,6-Tribromophenol	66%		19-152%
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	78%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.10	2900	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-07		Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64238.D	1	04/16/19 12:59	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.65	0.54	ug/kg	
319-84-6	alpha-BHC	ND	0.65	0.53	ug/kg	
319-85-7	beta-BHC	ND	0.65	0.59	ug/kg	
319-86-8	delta-BHC	ND	0.65	0.63	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.65	0.48	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.65	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.65	0.30	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.65	0.30	ug/kg	
60-57-1	Dieldrin	ND	0.65	0.45	ug/kg	
72-54-8	4,4'-DDD	ND	0.65	0.60	ug/kg	
72-55-9	4,4'-DDE	ND	0.65	0.57	ug/kg	
50-29-3	4,4'-DDT	ND	0.65	0.58	ug/kg	
72-20-8	Endrin	ND	0.65	0.51	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.65	0.51	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.65	0.37	ug/kg	
959-98-8	Endosulfan-I	ND	0.65	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	0.65	0.41	ug/kg	
76-44-8	Heptachlor	ND	0.65	0.56	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.65	0.46	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.52	ug/kg	
53494-70-5	Endrin ketone	ND	0.65	0.47	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		25-135%
877-09-8	Tetrachloro-m-xylene	70%		25-135%
2051-24-3	Decachlorobiphenyl	71%		10-156%
2051-24-3	Decachlorobiphenyl	80%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-07		
Lab Sample ID: JC86307-7A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178501.D	1	04/16/19 19:02	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	33	15	ug/kg	
11104-28-2	Aroclor 1221	ND	33	17	ug/kg	
11141-16-5	Aroclor 1232	ND	33	25	ug/kg	
53469-21-9	Aroclor 1242	ND	33	13	ug/kg	
12672-29-6	Aroclor 1248	ND	33	29	ug/kg	
11097-69-1	Aroclor 1254	ND	33	18	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	33	14	ug/kg	
11100-14-4	Aroclor 1268	ND	33	14	ug/kg	
37324-23-5	Aroclor 1262	ND	33	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		31-146%
877-09-8	Tetrachloro-m-xylene	83%		31-146%
2051-24-3	Decachlorobiphenyl	96%		17-164%
2051-24-3	Decachlorobiphenyl	115%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-07		
Lab Sample ID: JC86307-7A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: NJDEP EPH SW846 3546		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Z53417.D	1	04/18/19 15:01	RK	04/18/19 09:30	OP19831	G5Z1614
Run #2							

	Initial Weight	Final Volume
Run #1	15.2 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.6	2.0	mg/kg	
	EPH (> C28-C40)	ND	6.6	2.0	mg/kg	
	Total EPH (C9-C40)	ND	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	56%		40-140%
3386-33-2	1-Chlorooctadecane	60%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-07	Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	18000	51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Barium	30.5	21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium	< 0.21	0.21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.51	0.51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	12200	510	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	4.5	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	16.0	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Copper	115	2.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Iron	17200	51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Lead	2.5	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	3200	510	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	136	1.5	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	13.2	4.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	1120	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.51	0.51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	2780	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	90.6	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	28.3	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-07		Date Sampled: 04/12/19
Lab Sample ID: JC86307-7A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 16:19	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-08		
Lab Sample ID: JC86307-8A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225055.D	1	04/16/19 18:12	RS	04/15/19 11:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	4.9 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10	5.1	ug/kg	
71-43-2	Benzene	ND	0.51	0.39	ug/kg	
74-97-5	Bromochloromethane	ND	5.1	0.44	ug/kg	
75-27-4	Bromodichloromethane	ND	2.1	0.45	ug/kg	
75-25-2	Bromoform	ND	5.1	0.41	ug/kg	
74-83-9	Bromomethane	ND	5.1	1.0	ug/kg	
78-93-3	2-Butanone (MEK)	ND	10	3.8	ug/kg	
75-15-0	Carbon disulfide	ND	2.1	0.95	ug/kg	
56-23-5	Carbon tetrachloride	ND	2.1	0.56	ug/kg	
108-90-7	Chlorobenzene	ND	2.1	0.36	ug/kg	
75-00-3	Chloroethane	ND	5.1	0.71	ug/kg	
67-66-3	Chloroform	ND	2.1	0.38	ug/kg	
74-87-3	Chloromethane	ND	5.1	2.0	ug/kg	
110-82-7	Cyclohexane	ND	2.1	0.42	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.1	0.86	ug/kg	
124-48-1	Dibromochloromethane	ND	2.1	0.35	ug/kg	
106-93-4	1,2-Dibromoethane	ND	1.0	0.33	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1.0	0.31	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1.0	0.37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1.0	0.35	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.1	0.65	ug/kg	
75-34-3	1,1-Dichloroethane	ND	1.0	0.40	ug/kg	
107-06-2	1,2-Dichloroethane	ND	1.0	0.48	ug/kg	
75-35-4	1,1-Dichloroethene	ND	1.0	0.67	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	0.98	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	0.68	ug/kg	
78-87-5	1,2-Dichloropropane	ND	2.1	0.42	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	2.1	0.36	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	2.1	0.34	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	0.57	ug/kg	
76-13-1	Freon 113	ND	5.1	0.78	ug/kg	
591-78-6	2-Hexanone	ND	5.1	1.3	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	2.1	0.72	ug/kg	
79-20-9	Methyl Acetate	ND	5.1	1.4	ug/kg	
108-87-2	Methylcyclohexane	ND	2.1	0.73	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.36	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	5.1	1.6	ug/kg	
75-09-2	Methylene chloride	ND	5.1	2.6	ug/kg	
100-42-5	Styrene	ND	2.1	0.59	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.1	0.40	ug/kg	
127-18-4	Tetrachloroethene	ND	2.1	0.47	ug/kg	
108-88-3	Toluene	ND	1.0	0.39	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.1	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	2.1	0.44	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	2.1	0.35	ug/kg	
79-01-6	Trichloroethene	ND	1.0	0.78	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.1	0.70	ug/kg	
75-01-4	Vinyl chloride	ND	2.1	0.48	ug/kg	
	m,p-Xylene	ND	1.0	0.77	ug/kg	
95-47-6	o-Xylene	ND	1.0	0.60	ug/kg	
1330-20-7	Xylene (total)	ND	1.0	0.60	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		75-127%
17060-07-0	1,2-Dichloroethane-D4	98%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	99%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58555.D	1	04/17/19 10:05	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	58	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	87	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.0	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	66	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.1	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-08	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-8A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.0	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	16	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	66	27	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	14	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	66	5.3	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.8	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	66	7.0	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.4	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.7	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.2	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.5	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	10	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		23-115%

ND = Not detected MDL = Method Detection Limit

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J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	71%		27-114%
118-79-6	2,4,6-Tribromophenol	69%		19-152%
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	69%		39-124%
1718-51-0	Terphenyl-d14	78%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3000	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64239.D	1	04/16/19 13:17	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.62	0.51	ug/kg	
319-84-6	alpha-BHC	ND	0.62	0.50	ug/kg	
319-85-7	beta-BHC	ND	0.62	0.56	ug/kg	
319-86-8	delta-BHC	ND	0.62	0.59	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.62	0.45	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.62	0.50	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.62	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.62	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.62	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	0.62	0.57	ug/kg	
72-55-9	4,4'-DDE	ND	0.62	0.54	ug/kg	
50-29-3	4,4'-DDT	ND	0.62	0.55	ug/kg	
72-20-8	Endrin	ND	0.62	0.48	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.62	0.48	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.62	0.35	ug/kg	
959-98-8	Endosulfan-I	ND	0.62	0.36	ug/kg	
33213-65-9	Endosulfan-II	ND	0.62	0.39	ug/kg	
76-44-8	Heptachlor	ND	0.62	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.62	0.43	ug/kg	
72-43-5	Methoxychlor	ND	1.2	0.49	ug/kg	
53494-70-5	Endrin ketone	ND	0.62	0.45	ug/kg	
8001-35-2	Toxaphene	ND	15	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	56%		25-135%
877-09-8	Tetrachloro-m-xylene	57%		25-135%
2051-24-3	Decachlorobiphenyl	57%		10-156%
2051-24-3	Decachlorobiphenyl	66%		10-156%

ND = Not detected MDL = Method Detection Limit

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E = Indicates value exceeds calibration range

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Report of Analysis

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Client Sample ID: RB-08		
Lab Sample ID: JC86307-8A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178502.D	1	04/16/19 19:19	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	14	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	24	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	28	ug/kg	
11097-69-1	Aroclor 1254	ND	31	17	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		31-146%
877-09-8	Tetrachloro-m-xylene	68%		31-146%
2051-24-3	Decachlorobiphenyl	78%		17-164%
2051-24-3	Decachlorobiphenyl	97%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
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 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	RB-08	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-8A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5Z53418.D	1	04/18/19 15:36	RK	04/18/19 09:30	OP19831	G5Z1614
Run #2							

	Initial Weight	Final Volume
Run #1	15.4 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.5	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.5	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.5	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	71%		40-140%
3386-33-2	1-Chlorooctadecane	78%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	25200	48	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 1.9	1.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 1.9	1.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	51.8	19	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.19	0.19	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.48	0.48	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	16900	480	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	60.0	0.97	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	15.3	4.8	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	76.2	2.4	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	11700	48	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.4	1.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	7240	480	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	136	1.5	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.033	0.033	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	23.2	3.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	1120	970	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 1.9	1.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.48	0.48	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	3370	970	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.97	0.97	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	40.2	4.8	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	22.1	4.8	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

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Report of Analysis

Client Sample ID: RB-08		Date Sampled: 04/12/19
Lab Sample ID: JC86307-8A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.22	0.22	mg/kg	1	04/17/19 16:21	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225056.D	1	04/16/19 19:29	RS	04/15/19 21:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.4 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.3	4.6	ug/kg	
71-43-2	Benzene	ND	0.46	0.35	ug/kg	
74-97-5	Bromochloromethane	ND	4.6	0.40	ug/kg	
75-27-4	Bromodichloromethane	ND	1.9	0.41	ug/kg	
75-25-2	Bromoform	ND	4.6	0.37	ug/kg	
74-83-9	Bromomethane	ND	4.6	0.93	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.3	3.5	ug/kg	
75-15-0	Carbon disulfide	ND	1.9	0.86	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.9	0.51	ug/kg	
108-90-7	Chlorobenzene	ND	1.9	0.33	ug/kg	
75-00-3	Chloroethane	ND	4.6	0.64	ug/kg	
67-66-3	Chloroform	ND	1.9	0.35	ug/kg	
74-87-3	Chloromethane	ND	4.6	1.8	ug/kg	
110-82-7	Cyclohexane	ND	1.9	0.38	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.9	0.78	ug/kg	
124-48-1	Dibromochloromethane	ND	1.9	0.31	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.93	0.30	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.93	0.28	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.93	0.33	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.93	0.32	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.6	0.59	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.93	0.36	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.93	0.44	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.93	0.61	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.93	0.89	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.93	0.62	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.9	0.38	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.9	0.33	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.9	0.30	ug/kg	
100-41-4	Ethylbenzene	ND	0.93	0.51	ug/kg	
76-13-1	Freon 113	ND	4.6	0.71	ug/kg	
591-78-6	2-Hexanone	ND	4.6	1.2	ug/kg	

ND = Not detected MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.9	0.65	ug/kg	
79-20-9	Methyl Acetate	ND	4.6	1.3	ug/kg	
108-87-2	Methylcyclohexane	ND	1.9	0.66	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.93	0.33	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.6	1.5	ug/kg	
75-09-2	Methylene chloride	ND	4.6	2.3	ug/kg	
100-42-5	Styrene	ND	1.9	0.53	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	0.36	ug/kg	
127-18-4	Tetrachloroethene	ND	1.9	0.43	ug/kg	
108-88-3	Toluene	ND	0.93	0.35	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.6	0.93	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.6	0.93	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.9	0.40	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.9	0.32	ug/kg	
79-01-6	Trichloroethene	ND	0.93	0.71	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.6	0.63	ug/kg	
75-01-4	Vinyl chloride	ND	1.9	0.44	ug/kg	
	m,p-Xylene	ND	0.93	0.69	ug/kg	
95-47-6	o-Xylene	ND	0.93	0.54	ug/kg	
1330-20-7	Xylene (total)	ND	0.93	0.54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		75-127%
17060-07-0	1,2-Dichloroethane-D4	98%		75-130%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	98%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58568.D	1	04/17/19 14:08	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	12	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	21	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-09	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-9A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.6
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.6	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.7	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.7	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	72%		27-114%
118-79-6	2,4,6-Tribromophenol	60%		19-152%
4165-60-0	Nitrobenzene-d5	70%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	74%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3400	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.9
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Report of Analysis

Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64240.D	1	04/16/19 13:35	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.61	0.50	ug/kg	
319-84-6	alpha-BHC	ND	0.61	0.50	ug/kg	
319-85-7	beta-BHC	ND	0.61	0.55	ug/kg	
319-86-8	delta-BHC	ND	0.61	0.59	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.61	0.45	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.61	0.49	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.61	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.61	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.61	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	0.61	0.56	ug/kg	
72-55-9	4,4'-DDE	ND	0.61	0.54	ug/kg	
50-29-3	4,4'-DDT	ND	0.61	0.54	ug/kg	
72-20-8	Endrin	ND	0.61	0.48	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.61	0.48	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.61	0.35	ug/kg	
959-98-8	Endosulfan-I	ND	0.61	0.35	ug/kg	
33213-65-9	Endosulfan-II	ND	0.61	0.38	ug/kg	
76-44-8	Heptachlor	ND	0.61	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.61	0.43	ug/kg	
72-43-5	Methoxychlor	ND	1.2	0.49	ug/kg	
53494-70-5	Endrin ketone	ND	0.61	0.44	ug/kg	
8001-35-2	Toxaphene	ND	15	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		25-135%
877-09-8	Tetrachloro-m-xylene	64%		25-135%
2051-24-3	Decachlorobiphenyl	65%		10-156%
2051-24-3	Decachlorobiphenyl	72%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-09		
Lab Sample ID: JC86307-9A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8082A SW846 3546		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178503.D	1	04/16/19 19:36	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	14	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	24	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	27	ug/kg	
11097-69-1	Aroclor 1254	ND	31	16	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		31-146%
877-09-8	Tetrachloro-m-xylene	75%		31-146%
2051-24-3	Decachlorobiphenyl	87%		17-164%
2051-24-3	Decachlorobiphenyl	94%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	RB-09	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-9A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.6
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Y61674.D	1	04/18/19 15:01	RK	04/18/19 09:30	OP19831	G4Y2136
Run #2							

	Initial Weight	Final Volume
Run #1	15.1 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28) ^a	ND UJ	6.6	2.0	mg/kg	
	EPH (> C28-C40) ^a	ND UJ	6.6	2.0	mg/kg	
	Total EPH (C9-C40) ^a	ND UJ	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	93%		40-140%
3386-33-2	1-Chlorooctadecane	100%		40-140%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-09	Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	18100	52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Barium	< 21	21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium	< 0.21	0.21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	11500	520	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	4.9	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	18.1	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Copper	134	2.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Iron	19800	52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Lead	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	4020	520	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	145	1.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	15.0	4.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	< 1000	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	2650	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Thallium	1.2	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	94.9	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	30.5	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-09		Date Sampled: 04/12/19
Lab Sample ID: JC86307-9A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.22	0.22	mg/kg	1	04/17/19 16:22	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-10		
Lab Sample ID: JC86307-10A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225057.D	1	04/16/19 19:56	RS	04/15/19 21:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.7 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.9	4.4	ug/kg	
71-43-2	Benzene	ND	0.44	0.33	ug/kg	
74-97-5	Bromochloromethane	ND	4.4	0.38	ug/kg	
75-27-4	Bromodichloromethane	ND	1.8	0.39	ug/kg	
75-25-2	Bromoform	ND	4.4	0.36	ug/kg	
74-83-9	Bromomethane	ND	4.4	0.88	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.9	3.3	ug/kg	
75-15-0	Carbon disulfide	ND	1.8	0.82	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.8	0.49	ug/kg	
108-90-7	Chlorobenzene	ND	1.8	0.31	ug/kg	
75-00-3	Chloroethane	ND	4.4	0.61	ug/kg	
67-66-3	Chloroform	ND	1.8	0.33	ug/kg	
74-87-3	Chloromethane	ND	4.4	1.7	ug/kg	
110-82-7	Cyclohexane	ND	1.8	0.36	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.8	0.74	ug/kg	
124-48-1	Dibromochloromethane	ND	1.8	0.30	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.89	0.29	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.89	0.27	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.89	0.32	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.89	0.30	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.4	0.56	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.89	0.34	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.89	0.42	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.89	0.58	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.89	0.85	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.89	0.59	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.8	0.36	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.8	0.31	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.8	0.29	ug/kg	
100-41-4	Ethylbenzene	ND	0.89	0.49	ug/kg	
76-13-1	Freon 113	ND	4.4	0.68	ug/kg	
591-78-6	2-Hexanone	ND	4.4	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.8	0.62	ug/kg	
79-20-9	Methyl Acetate	ND	4.4	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.8	0.63	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.89	0.31	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.4	1.4	ug/kg	
75-09-2	Methylene chloride	ND	4.4	2.2	ug/kg	
100-42-5	Styrene	ND	1.8	0.51	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	0.35	ug/kg	
127-18-4	Tetrachloroethene	ND	1.8	0.41	ug/kg	
108-88-3	Toluene	ND	0.89	0.33	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.4	0.89	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.4	0.89	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.8	0.38	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.8	0.30	ug/kg	
79-01-6	Trichloroethene	ND	0.89	0.68	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.4	0.60	ug/kg	
75-01-4	Vinyl chloride	ND	1.8	0.42	ug/kg	
	m,p-Xylene	ND	0.89	0.66	ug/kg	
95-47-6	o-Xylene	ND	0.89	0.52	ug/kg	
1330-20-7	Xylene (total)	ND	0.89	0.52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		75-127%
17060-07-0	1,2-Dichloroethane-D4	100%		75-130%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	99%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.10
4

Report of Analysis

Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58557.D	1	04/17/19 11:16	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	66	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	66	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	66	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	69%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-10 Lab Sample ID: JC86307-10A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/12/19 Date Received: 04/12/19 Percent Solids: 99.0
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	71%		27-114%
118-79-6	2,4,6-Tribromophenol	71%		19-152%
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	70%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3000	ug/kg	J R
	system artifact/aldol-condensation	2.49	140	ug/kg	J N
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.10
4

Report of Analysis

Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64241.D	1	04/16/19 13:53	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.63	0.52	ug/kg	
319-84-6	alpha-BHC	ND	0.63	0.51	ug/kg	
319-85-7	beta-BHC	ND	0.63	0.57	ug/kg	
319-86-8	delta-BHC	ND	0.63	0.60	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.63	0.46	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.63	0.51	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.63	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.63	0.28	ug/kg	
60-57-1	Dieldrin	0.49 0.63 U	0.63	0.43	ug/kg	J
72-54-8	4,4'-DDD	ND	0.63	0.58	ug/kg	
72-55-9	4,4'-DDE	ND	0.63	0.55	ug/kg	
50-29-3	4,4'-DDT	ND	0.63	0.56	ug/kg	
72-20-8	Endrin	ND	0.63	0.49	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.63	0.49	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.63	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.63	0.36	ug/kg	
33213-65-9	Endosulfan-II	ND	0.63	0.39	ug/kg	
76-44-8	Heptachlor	ND	0.63	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.63	0.44	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.50	ug/kg	
53494-70-5	Endrin ketone	ND	0.63	0.45	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	52%		25-135%
877-09-8	Tetrachloro-m-xylene	52%		25-135%
2051-24-3	Decachlorobiphenyl	54%		10-156%
2051-24-3	Decachlorobiphenyl	59%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178504.D	1	04/16/19 19:53	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	15	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	24	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	28	ug/kg	
11097-69-1	Aroclor 1254	ND	31	17	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	60%		31-146%
877-09-8	Tetrachloro-m-xylene	62%		31-146%
2051-24-3	Decachlorobiphenyl	72%		17-164%
2051-24-3	Decachlorobiphenyl	79%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-10		Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.0
Method: NJDEP EPH SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61669.D	1	04/18/19 12:10	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

	Initial Weight	Final Volume
Run #1	15.9 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.4	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.4	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.4	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	81%		40-140%
3386-33-2	1-Chlorooctadecane	79%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-10	Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	21600	51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Barium	41.1	20	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.51	0.51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	15500	510	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	66.7	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	17.0	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Copper	84.8	2.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Iron	12500	51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Lead	5.5	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	8800	510	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	163	1.5	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	27.6	4.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	1200	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.51	0.51	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	2690	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	40.4	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	29.5	5.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-10	Date Sampled: 04/12/19
Lab Sample ID: JC86307-10A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.25	0.25	mg/kg	1	04/17/19 16:26	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-11		
Lab Sample ID: JC86307-11A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225058.D	1	04/16/19 20:24	RS	04/15/19 21:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.8 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.7	4.3	ug/kg	
71-43-2	Benzene	ND	0.43	0.33	ug/kg	
74-97-5	Bromochloromethane	ND	4.3	0.37	ug/kg	
75-27-4	Bromodichloromethane	ND	1.7	0.38	ug/kg	
75-25-2	Bromoform	ND	4.3	0.35	ug/kg	
74-83-9	Bromomethane	ND	4.3	0.86	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.7	3.2	ug/kg	
75-15-0	Carbon disulfide	ND	1.7	0.80	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.7	0.48	ug/kg	
108-90-7	Chlorobenzene	ND	1.7	0.31	ug/kg	
75-00-3	Chloroethane	ND	4.3	0.60	ug/kg	
67-66-3	Chloroform	ND	1.7	0.32	ug/kg	
74-87-3	Chloromethane	ND	4.3	1.7	ug/kg	
110-82-7	Cyclohexane	ND	1.7	0.35	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.7	0.72	ug/kg	
124-48-1	Dibromochloromethane	ND	1.7	0.29	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.87	0.28	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.87	0.26	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.87	0.31	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.87	0.30	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.3	0.55	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.87	0.33	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.87	0.41	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.87	0.57	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.87	0.83	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.87	0.58	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.7	0.35	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.7	0.30	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.7	0.28	ug/kg	
100-41-4	Ethylbenzene	ND	0.87	0.48	ug/kg	
76-13-1	Freon 113	ND	4.3	0.66	ug/kg	
591-78-6	2-Hexanone	ND	4.3	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.7	0.60	ug/kg	
79-20-9	Methyl Acetate	ND	4.3	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.7	0.61	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.87	0.30	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.3	1.4	ug/kg	
75-09-2	Methylene chloride	ND	4.3	2.2	ug/kg	
100-42-5	Styrene	ND	1.7	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.7	0.34	ug/kg	
127-18-4	Tetrachloroethene	ND	1.7	0.40	ug/kg	
108-88-3	Toluene	ND	0.87	0.33	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.3	0.87	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.3	0.87	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.7	0.37	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.7	0.30	ug/kg	
79-01-6	Trichloroethene	ND	0.87	0.66	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.3	0.59	ug/kg	
75-01-4	Vinyl chloride	ND	1.7	0.41	ug/kg	
	m,p-Xylene	ND	0.87	0.65	ug/kg	
95-47-6	o-Xylene	ND	0.87	0.51	ug/kg	
1330-20-7	Xylene (total)	ND	0.87	0.51	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	115%		75-127%
17060-07-0	1,2-Dichloroethane-D4	104%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	97%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.11
4

Report of Analysis

Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58558.D	1	04/17/19 11:40	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	340	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	ND	34	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	34	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	34	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.9	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-11	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-11A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	34	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	34	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	34	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	34	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	34	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	34	15	ug/kg	
86-73-7	Fluorene	ND	34	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND	34	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	340	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	34	16	ug/kg	
78-59-1	Isophorone	ND	67	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	34	7.6	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.7	ug/kg	
91-20-3	Naphthalene	ND	34	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.7	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	34	11	ug/kg	
129-00-0	Pyrene	ND	34	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	66%		27-114%
118-79-6	2,4,6-Tribromophenol	62%		19-152%
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	66%		39-124%
1718-51-0	Terphenyl-d14	73%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3000	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64242.D	1	04/16/19 14:11	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.65	0.54	ug/kg	
319-84-6	alpha-BHC	ND	0.65	0.53	ug/kg	
319-85-7	beta-BHC	ND	0.65	0.59	ug/kg	
319-86-8	delta-BHC	ND	0.65	0.63	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.65	0.48	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.65	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.65	0.30	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.65	0.30	ug/kg	
60-57-1	Dieldrin	ND	0.65	0.45	ug/kg	
72-54-8	4,4'-DDD	ND	0.65	0.60	ug/kg	
72-55-9	4,4'-DDE	ND	0.65	0.57	ug/kg	
50-29-3	4,4'-DDT	ND	0.65	0.58	ug/kg	
72-20-8	Endrin	ND	0.65	0.51	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.65	0.51	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.65	0.37	ug/kg	
959-98-8	Endosulfan-I	ND	0.65	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	0.65	0.41	ug/kg	
76-44-8	Heptachlor	ND	0.65	0.56	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.65	0.46	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.52	ug/kg	
53494-70-5	Endrin ketone	ND	0.65	0.47	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		25-135%
877-09-8	Tetrachloro-m-xylene	71%		25-135%
2051-24-3	Decachlorobiphenyl	73%		10-156%
2051-24-3	Decachlorobiphenyl	81%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

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N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178509.D	1	04/16/19 21:17	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	33	15	ug/kg	
11104-28-2	Aroclor 1221	ND	33	17	ug/kg	
11141-16-5	Aroclor 1232	ND	33	25	ug/kg	
53469-21-9	Aroclor 1242	ND	33	13	ug/kg	
12672-29-6	Aroclor 1248	ND	33	29	ug/kg	
11097-69-1	Aroclor 1254	ND	33	18	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	33	14	ug/kg	
11100-14-4	Aroclor 1268	ND	33	14	ug/kg	
37324-23-5	Aroclor 1262	ND	33	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		31-146%
877-09-8	Tetrachloro-m-xylene	87%		31-146%
2051-24-3	Decachlorobiphenyl	100%		17-164%
2051-24-3	Decachlorobiphenyl	110%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: NJDEP EPH SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61670.D	1	04/18/19 12:44	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

	Initial Weight	Final Volume
Run #1	15.6 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.4	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.4	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.4	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	78%		40-140%
3386-33-2	1-Chlorooctadecane	78%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-11		Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	20100	52	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	47.6	21	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.21	0.21	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	14100	520	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	77.4	1.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	12.7	5.2	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	69.9	2.6	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	11500	52	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.9	2.1	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	6940	520	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	121	1.6	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	22.9	4.1	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	1100	1000	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	2530	1000	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	43.3	5.2	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	20.9	5.2	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: RB-11	Date Sampled: 04/12/19
Lab Sample ID: JC86307-11A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.22	0.22	mg/kg	1	04/17/19 16:28	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225059.D	1	04/16/19 20:52	RS	04/15/19 21:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	5.6 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.0	4.5	ug/kg	
71-43-2	Benzene	ND	0.45	0.34	ug/kg	
74-97-5	Bromochloromethane	ND	4.5	0.39	ug/kg	
75-27-4	Bromodichloromethane	ND	1.8	0.40	ug/kg	
75-25-2	Bromoform	ND	4.5	0.36	ug/kg	
74-83-9	Bromomethane	ND	4.5	0.89	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.0	3.4	ug/kg	
75-15-0	Carbon disulfide	ND	1.8	0.83	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.8	0.49	ug/kg	
108-90-7	Chlorobenzene	ND	1.8	0.32	ug/kg	
75-00-3	Chloroethane	ND	4.5	0.62	ug/kg	
67-66-3	Chloroform	ND	1.8	0.33	ug/kg	
74-87-3	Chloromethane	ND	4.5	1.8	ug/kg	
110-82-7	Cyclohexane	ND	1.8	0.36	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.8	0.75	ug/kg	
124-48-1	Dibromochloromethane	ND	1.8	0.30	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.90	0.29	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.90	0.27	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.90	0.32	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.90	0.31	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.5	0.57	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.90	0.35	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.90	0.42	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.90	0.59	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.90	0.86	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.90	0.60	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.8	0.37	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.8	0.32	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.8	0.29	ug/kg	
100-41-4	Ethylbenzene	ND	0.90	0.50	ug/kg	
76-13-1	Freon 113	ND	4.5	0.68	ug/kg	
591-78-6	2-Hexanone	ND	4.5	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.8	0.63	ug/kg	
79-20-9	Methyl Acetate	ND	4.5	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.8	0.63	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.90	0.32	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.5	1.4	ug/kg	
75-09-2	Methylene chloride	ND	4.5	2.2	ug/kg	
100-42-5	Styrene	ND	1.8	0.52	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	0.35	ug/kg	
127-18-4	Tetrachloroethene	ND	1.8	0.41	ug/kg	
108-88-3	Toluene	ND	0.90	0.34	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.5	0.90	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.5	0.90	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.8	0.38	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.8	0.31	ug/kg	
79-01-6	Trichloroethene	ND	0.90	0.68	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.5	0.61	ug/kg	
75-01-4	Vinyl chloride	ND	1.8	0.42	ug/kg	
	m,p-Xylene	ND	0.90	0.67	ug/kg	
95-47-6	o-Xylene	ND	0.90	0.52	ug/kg	
1330-20-7	Xylene (total)	ND	0.90	0.52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	115%		75-127%
17060-07-0	1,2-Dichloroethane-D4	101%		75-130%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	97%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.12
4

Report of Analysis

Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58559.D	1	04/17/19 12:05	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	27	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	12	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.1	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	7.9	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-12	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-12A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.5
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.3	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.6	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.6	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	65%		23-115%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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4

Report of Analysis

Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	70%		27-114%
118-79-6	2,4,6-Tribromophenol	58%		19-152%
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	70%		39-124%
1718-51-0	Terphenyl-d14	75%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3200	ug/kg	J R
	system artifact/aldol-condensation	2.49	150	ug/kg	J N
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.12
4

Report of Analysis

Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64243.D	1	04/16/19 14:30	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.62	0.51	ug/kg	
319-84-6	alpha-BHC	ND	0.62	0.51	ug/kg	
319-85-7	beta-BHC	ND	0.62	0.56	ug/kg	
319-86-8	delta-BHC	ND	0.62	0.60	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.62	0.46	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.62	0.50	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.62	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.62	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.62	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	0.62	0.57	ug/kg	
72-55-9	4,4'-DDE	ND	0.62	0.55	ug/kg	
50-29-3	4,4'-DDT	ND	0.62	0.55	ug/kg	
72-20-8	Endrin	ND	0.62	0.49	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.62	0.49	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.62	0.35	ug/kg	
959-98-8	Endosulfan-I	ND	0.62	0.36	ug/kg	
33213-65-9	Endosulfan-II	ND	0.62	0.39	ug/kg	
76-44-8	Heptachlor	ND	0.62	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.62	0.44	ug/kg	
72-43-5	Methoxychlor	ND	1.2	0.50	ug/kg	
53494-70-5	Endrin ketone	ND	0.62	0.45	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		25-135%
877-09-8	Tetrachloro-m-xylene	66%		25-135%
2051-24-3	Decachlorobiphenyl	67%		10-156%
2051-24-3	Decachlorobiphenyl	76%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178510.D	1	04/16/19 21:34	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	31	15	ug/kg	
11104-28-2	Aroclor 1221	ND	31	16	ug/kg	
11141-16-5	Aroclor 1232	ND	31	24	ug/kg	
53469-21-9	Aroclor 1242	ND	31	13	ug/kg	
12672-29-6	Aroclor 1248	ND	31	28	ug/kg	
11097-69-1	Aroclor 1254	ND	31	17	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	31	13	ug/kg	
11100-14-4	Aroclor 1268	ND	31	13	ug/kg	
37324-23-5	Aroclor 1262	ND	31	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		31-146%
877-09-8	Tetrachloro-m-xylene	81%		31-146%
2051-24-3	Decachlorobiphenyl	91%		17-164%
2051-24-3	Decachlorobiphenyl	101%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	RB-12	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-12A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.5
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61671.D	1	04/18/19 13:19	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

	Initial Weight	Final Volume
Run #1	15.5 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.5	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.5	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.5	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	79%		40-140%
3386-33-2	1-Chlorooctadecane	79%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-12		Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	24700	49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	36.2	20	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.49	0.49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	17200	490	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	44.9	0.99	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	15.0	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	78.8	2.5	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	11800	49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.6	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	7560	490	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	124	1.5	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	22.7	3.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	< 990	990	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.49	0.49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	3370	990	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.99	0.99	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	38.1	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	24.9	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: RB-12	Date Sampled: 04/12/19
Lab Sample ID: JC86307-12A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.25	0.25	mg/kg	1	04/17/19 16:29	KI	SW846 9012B/LACHAT

RL = Reporting Limit

4.12
4

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Report of Analysis

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Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225060.D	1	04/16/19 21:20	RS	04/15/19 21:00	n/a	VC8394
Run #2							

Run #	Initial Weight
Run #1	6.0 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	8.4	4.2	ug/kg	
71-43-2	Benzene	ND	0.42	0.32	ug/kg	
74-97-5	Bromochloromethane	ND	4.2	0.36	ug/kg	
75-27-4	Bromodichloromethane	ND	1.7	0.37	ug/kg	
75-25-2	Bromoform	ND	4.2	0.34	ug/kg	
74-83-9	Bromomethane	ND	4.2	0.84	ug/kg	
78-93-3	2-Butanone (MEK)	ND	8.4	3.1	ug/kg	
75-15-0	Carbon disulfide	ND	1.7	0.78	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.7	0.46	ug/kg	
108-90-7	Chlorobenzene	ND	1.7	0.30	ug/kg	
75-00-3	Chloroethane	ND	4.2	0.58	ug/kg	
67-66-3	Chloroform	ND	1.7	0.31	ug/kg	
74-87-3	Chloromethane	ND	4.2	1.6	ug/kg	
110-82-7	Cyclohexane	ND	1.7	0.34	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.7	0.70	ug/kg	
124-48-1	Dibromochloromethane	ND	1.7	0.28	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.84	0.27	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.84	0.26	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.84	0.30	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.84	0.29	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	4.2	0.53	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.84	0.32	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.84	0.39	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.84	0.55	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.84	0.80	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.84	0.56	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.7	0.34	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.7	0.30	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.7	0.27	ug/kg	
100-41-4	Ethylbenzene	ND	0.84	0.46	ug/kg	
76-13-1	Freon 113	ND	4.2	0.64	ug/kg	
591-78-6	2-Hexanone	ND	4.2	1.1	ug/kg	

ND = Not detected MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-13	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-13A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.3
Method:	SW846 8260C SW846 5035		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.7	0.58	ug/kg	
79-20-9	Methyl Acetate	ND	4.2	1.2	ug/kg	
108-87-2	Methylcyclohexane	ND	1.7	0.59	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.84	0.30	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.2	1.3	ug/kg	
75-09-2	Methylene chloride	ND	4.2	2.1	ug/kg	
100-42-5	Styrene	ND	1.7	0.48	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.7	0.33	ug/kg	
127-18-4	Tetrachloroethene	ND	1.7	0.39	ug/kg	
108-88-3	Toluene	ND	0.84	0.32	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.2	0.84	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.2	0.84	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.7	0.36	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.7	0.29	ug/kg	
79-01-6	Trichloroethene	ND	0.84	0.64	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.2	0.57	ug/kg	
75-01-4	Vinyl chloride	ND	1.7	0.39	ug/kg	
	m,p-Xylene	ND	0.84	0.63	ug/kg	
95-47-6	o-Xylene	ND	0.84	0.49	ug/kg	
1330-20-7	Xylene (total)	ND	0.84	0.49	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		75-127%
17060-07-0	1,2-Dichloroethane-D4	100%		75-130%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	98%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58560.D	1	04/17/19 12:29	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	67	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	21	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	29	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	60	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	170	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	170	36	ug/kg	
95-48-7	2-Methylphenol	ND	67	21	ug/kg	
	3&4-Methylphenol	ND	67	28	ug/kg	
88-75-5	2-Nitrophenol	ND	170	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	89	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	67	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	20	ug/kg	
83-32-9	Acenaphthene	ND	33	12	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	170	7.2	ug/kg	
120-12-7	Anthracene	ND	33	21	ug/kg	
1912-24-9	Atrazine	ND	67	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	67	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	67	8.2	ug/kg	
92-52-4	1,1'-Biphenyl	ND	67	4.6	ug/kg	
100-52-7	Benzaldehyde	ND	170	8.3	ug/kg	
91-58-7	2-Chloronaphthalene	ND	67	8.0	ug/kg	
106-47-8	4-Chloroaniline	ND	170	12	ug/kg	
86-74-8	Carbazole	ND	67	4.9	ug/kg	

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N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-13	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-13A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.3
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	67	13	ug/kg	
218-01-9	Chrysene	ND	33	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	67	7.2	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	67	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	67	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	67	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	67	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	67	14	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	67	5.5	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	67	8.3	ug/kg	
84-66-2	Diethyl phthalate	ND	67	7.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	67	6.0	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	67	7.8	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	67	8.5	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	16	ug/kg	
78-59-1	Isophorone	ND	67	7.2	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.6	ug/kg	
88-74-4	2-Nitroaniline	ND	170	7.9	ug/kg	
99-09-2	3-Nitroaniline	ND	170	8.4	ug/kg	
100-01-6	4-Nitroaniline	ND	170	8.7	ug/kg	
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
98-95-3	Nitrobenzene	ND	67	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	67	9.7	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		23-115%

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N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	72%		27-114%
118-79-6	2,4,6-Tribromophenol	64%		19-152%
4165-60-0	Nitrobenzene-d5	73%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	80%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3300	ug/kg	J R
	Total TIC, Semi-Volatile		0	ug/kg	

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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64244.D	1	04/16/19 14:48	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.66	0.54	ug/kg	
319-84-6	alpha-BHC	ND	0.66	0.54	ug/kg	
319-85-7	beta-BHC	ND	0.66	0.60	ug/kg	
319-86-8	delta-BHC	ND	0.66	0.63	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.66	0.49	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.66	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.66	0.30	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.66	0.30	ug/kg	
60-57-1	Dieldrin	ND	0.66	0.45	ug/kg	
72-54-8	4,4'-DDD	ND	0.66	0.60	ug/kg	
72-55-9	4,4'-DDE	ND	0.66	0.58	ug/kg	
50-29-3	4,4'-DDT	ND	0.66	0.58	ug/kg	
72-20-8	Endrin	ND	0.66	0.51	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.66	0.51	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.66	0.37	ug/kg	
959-98-8	Endosulfan-I	ND	0.66	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	0.66	0.41	ug/kg	
76-44-8	Heptachlor	ND	0.66	0.57	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.66	0.46	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.52	ug/kg	
53494-70-5	Endrin ketone	ND	0.66	0.48	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		25-135%
877-09-8	Tetrachloro-m-xylene	64%		25-135%
2051-24-3	Decachlorobiphenyl	64%		10-156%
2051-24-3	Decachlorobiphenyl	72%		10-156%

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Report of Analysis

Page 1 of 1

Client Sample ID:	RB-13	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-13A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.3
Method:	SW846 8082A SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178511.D	1	04/16/19 21:51	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	33	15	ug/kg	
11104-28-2	Aroclor 1221	ND	33	17	ug/kg	
11141-16-5	Aroclor 1232	ND	33	25	ug/kg	
53469-21-9	Aroclor 1242	ND	33	13	ug/kg	
12672-29-6	Aroclor 1248	ND	33	29	ug/kg	
11097-69-1	Aroclor 1254	ND	33	18	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	33	14	ug/kg	
11100-14-4	Aroclor 1268	ND	33	14	ug/kg	
37324-23-5	Aroclor 1262	ND	33	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	83%		31-146%
877-09-8	Tetrachloro-m-xylene	85%		31-146%
2051-24-3	Decachlorobiphenyl	97%		17-164%
2051-24-3	Decachlorobiphenyl	107%		17-164%

(a) Associated CCV outside of control limits low.

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Report of Analysis

Page 1 of 1

Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Method: NJDEP EPH SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61672.D	1	04/18/19 13:53	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.3 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.6	2.0	mg/kg	
	EPH (> C28-C40)	ND	6.6	2.0	mg/kg	
	Total EPH (C9-C40)	ND	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	86%		40-140%
3386-33-2	1-Chlorooctadecane	87%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-13	Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	18300	52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Barium	23.9	21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium	< 0.21	0.21	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	12200	520	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	36.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	13.7	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Copper	74.3	2.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Iron	15900	52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Lead	2.5	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	6740	520	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	164	1.6	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.031	0.031	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	19.7	4.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	< 1000	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.1	2.1	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.52	0.52	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	2360	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	59.8	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	25.2	5.2	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-13		Date Sampled: 04/12/19
Lab Sample ID: JC86307-13A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 16:30	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

Page 1 of 2

Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225067.D	1	04/17/19 11:06	RS	04/15/19 21:00	n/a	VC8395
Run #2							

Run #	Initial Weight
Run #1	5.2 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	9.7	4.9	ug/kg	
71-43-2	Benzene	ND	0.49	0.37	ug/kg	
74-97-5	Bromochloromethane	ND	4.9	0.42	ug/kg	
75-27-4	Bromodichloromethane	ND	1.9	0.43	ug/kg	
75-25-2	Bromoform	ND	4.9	0.39	ug/kg	
74-83-9	Bromomethane ^b	ND JJ	4.9	0.97	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.7	3.6	ug/kg	
75-15-0	Carbon disulfide	ND	1.9	0.90	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.9	0.53	ug/kg	
108-90-7	Chlorobenzene	ND	1.9	0.34	ug/kg	
75-00-3	Chloroethane	ND	4.9	0.67	ug/kg	
67-66-3	Chloroform	ND	1.9	0.36	ug/kg	
74-87-3	Chloromethane	ND	4.9	1.9	ug/kg	
110-82-7	Cyclohexane	ND	1.9	0.39	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.9	0.81	ug/kg	
124-48-1	Dibromochloromethane	ND	1.9	0.33	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.97	0.32	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.97	0.30	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.97	0.35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.97	0.33	ug/kg	
75-71-8	Dichlorodifluoromethane ^b	ND JJ	4.9	0.62	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.97	0.37	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.97	0.46	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.97	0.64	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.97	0.93	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.97	0.65	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.9	0.39	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.9	0.34	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.9	0.32	ug/kg	
100-41-4	Ethylbenzene	ND	0.97	0.54	ug/kg	
76-13-1	Freon 113	ND	4.9	0.74	ug/kg	
591-78-6	2-Hexanone	ND	4.9	1.2	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-14	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-14A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.1
Method:	SW846 8260C SW846 5035		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.9	0.68	ug/kg	
79-20-9	Methyl Acetate	ND	4.9	1.3	ug/kg	
108-87-2	Methylcyclohexane	ND	1.9	0.69	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.97	0.34	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.9	1.5	ug/kg	
75-09-2	Methylene chloride	ND	4.9	2.4	ug/kg	
100-42-5	Styrene	ND	1.9	0.56	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	0.38	ug/kg	
127-18-4	Tetrachloroethene	ND	1.9	0.45	ug/kg	
108-88-3	Toluene	ND	0.97	0.36	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.9	0.97	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	0.97	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.9	0.41	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.9	0.33	ug/kg	
79-01-6	Trichloroethene	ND	0.97	0.74	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.9	0.66	ug/kg	
75-01-4	Vinyl chloride	ND	1.9	0.46	ug/kg	
	m,p-Xylene	ND	0.97	0.72	ug/kg	
95-47-6	o-Xylene	ND	0.97	0.57	ug/kg	
1330-20-7	Xylene (total)	ND	0.97	0.57	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		75-127%
17060-07-0	1,2-Dichloroethane-D4	105%		75-130%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	95%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

(a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory out of hold time.

(b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58561.D	1	04/17/19 12:54	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	66	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	59	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	66	21	ug/kg	
	3&4-Methylphenol	ND	66	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	88	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	66	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	25	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	20	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.1	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	66	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	66	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	66	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	66	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	66	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	66	4.8	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-14	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-14A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.1
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	66	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	66	7.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	66	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	66	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	66	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	17	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	66	28	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
132-64-9	Dibenzofuran	ND	66	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	66	5.4	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	66	8.2	ug/kg	
84-66-2	Diethyl phthalate	ND	66	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	66	5.9	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	66	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	66	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	66	7.1	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.5	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.8	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
98-95-3	Nitrobenzene	ND	66	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	66	9.5	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		23-115%

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N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-14 Lab Sample ID: JC86307-14A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/12/19 Date Received: 04/12/19 Percent Solids: 99.1
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	70%		27-114%
118-79-6	2,4,6-Tribromophenol	64%		19-152%
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	72%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3200	ug/kg	J R
	system artifact/aldol-condensation	2.49	140	ug/kg	JN
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.14
4

Report of Analysis

Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64245.D	1	04/16/19 15:06	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.7 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.64	0.53	ug/kg	
319-84-6	alpha-BHC	ND	0.64	0.52	ug/kg	
319-85-7	beta-BHC	ND	0.64	0.58	ug/kg	
319-86-8	delta-BHC	ND	0.64	0.62	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.64	0.47	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.64	0.52	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.64	0.29	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.64	0.29	ug/kg	
60-57-1	Dieldrin	ND	0.64	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	0.64	0.59	ug/kg	
72-55-9	4,4'-DDE	ND	0.64	0.56	ug/kg	
50-29-3	4,4'-DDT	ND	0.64	0.57	ug/kg	
72-20-8	Endrin	ND	0.64	0.50	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.64	0.50	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.64	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.64	0.37	ug/kg	
33213-65-9	Endosulfan-II	ND	0.64	0.40	ug/kg	
76-44-8	Heptachlor	ND	0.64	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.64	0.45	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.51	ug/kg	
53494-70-5	Endrin ketone	ND	0.64	0.46	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		25-135%
877-09-8	Tetrachloro-m-xylene	80%		25-135%
2051-24-3	Decachlorobiphenyl	85%		10-156%
2051-24-3	Decachlorobiphenyl	97%		10-156%

ND = Not detected MDL = Method Detection Limit

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E = Indicates value exceeds calibration range

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N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178512.D	1	04/16/19 22:08	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	32	15	ug/kg	
11104-28-2	Aroclor 1221	ND	32	16	ug/kg	
11141-16-5	Aroclor 1232	ND	32	25	ug/kg	
53469-21-9	Aroclor 1242	ND	32	13	ug/kg	
12672-29-6	Aroclor 1248	ND	32	29	ug/kg	
11097-69-1	Aroclor 1254	ND	32	17	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	32	14	ug/kg	
11100-14-4	Aroclor 1268	ND	32	14	ug/kg	
37324-23-5	Aroclor 1262	ND	32	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%		31-146%
877-09-8	Tetrachloro-m-xylene	79%		31-146%
2051-24-3	Decachlorobiphenyl	93%		17-164%
2051-24-3	Decachlorobiphenyl	104%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-14		Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.1
Method: NJDEP EPH SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Z61673.D	1	04/18/19 14:27	RK	04/18/19 09:30	OP19831	G4Z1913
Run #2							

	Initial Weight	Final Volume
Run #1	15.9 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28)	ND	6.3	1.9	mg/kg	
	EPH (> C28-C40)	ND	6.3	1.9	mg/kg	
	Total EPH (C9-C40)	ND	6.3	1.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		40-140%
3386-33-2	1-Chlorooctadecane	78%		40-140%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-14	Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	25800	50	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Barium	51.9	20	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cadmium	< 0.50	0.50	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Calcium	16700	500	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Chromium	84.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Cobalt	16.5	5.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Copper	166	2.5	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Iron	14400	50	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Lead	4.1	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Magnesium	8960	500	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Manganese	171	1.5	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL SW846 7471B ¹	SW846 7471B ⁴
Nickel	32.6	4.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Potassium	1070	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Silver	< 0.50	0.50	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Sodium	3570	1000	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Thallium	< 1.0	1.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Vanadium	37.2	5.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³
Zinc	28.1	5.0	mg/kg	1	04/15/19	04/17/19	ND SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

Report of Analysis

Client Sample ID: RB-14	Date Sampled: 04/12/19
Lab Sample ID: JC86307-14A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.24	0.24	mg/kg	1	04/17/19 16:32	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-15		
Lab Sample ID: JC86307-15A		Date Sampled: 04/12/19
Matrix: SO - Soil		Date Received: 04/12/19
Method: SW846 8260C SW846 5035		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225068.D	1	04/17/19 11:34	RS	04/15/19 21:00	n/a	VC8395
Run #2							

Run #	Initial Weight
Run #1	5.4 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	7.4	9.3	4.6	ug/kg	J+
71-43-2	Benzene	ND	0.46	0.35	ug/kg	
74-97-5	Bromochloromethane	ND	4.6	0.40	ug/kg	
75-27-4	Bromodichloromethane	ND	1.9	0.41	ug/kg	
75-25-2	Bromoform	ND	4.6	0.37	ug/kg	
74-83-9	Bromomethane ^b	ND UJ	4.6	0.93	ug/kg	
78-93-3	2-Butanone (MEK)	ND	9.3	3.5	ug/kg	
75-15-0	Carbon disulfide	ND	1.9	0.86	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.9	0.51	ug/kg	
108-90-7	Chlorobenzene	ND	1.9	0.33	ug/kg	
75-00-3	Chloroethane	ND	4.6	0.64	ug/kg	
67-66-3	Chloroform	ND	1.9	0.35	ug/kg	
74-87-3	Chloromethane	ND	4.6	1.8	ug/kg	
110-82-7	Cyclohexane	ND	1.9	0.38	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.9	0.78	ug/kg	
124-48-1	Dibromochloromethane	ND	1.9	0.31	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.93	0.30	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.93	0.28	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.93	0.33	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.93	0.32	ug/kg	
75-71-8	Dichlorodifluoromethane ^b	ND UJ	4.6	0.59	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.93	0.36	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.93	0.44	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.93	0.61	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.93	0.89	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.93	0.62	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.9	0.38	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.9	0.33	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.9	0.30	ug/kg	
100-41-4	Ethylbenzene	ND	0.93	0.51	ug/kg	
76-13-1	Freon 113	ND	4.6	0.71	ug/kg	
591-78-6	2-Hexanone	ND	4.6	1.2	ug/kg	

ND = Not detected MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-15		Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

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VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.9	0.65	ug/kg	
79-20-9	Methyl Acetate	ND	4.6	1.3	ug/kg	
108-87-2	Methylcyclohexane	ND	1.9	0.66	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.93	0.33	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	4.6	1.5	ug/kg	
75-09-2	Methylene chloride	ND	4.6	2.3	ug/kg	
100-42-5	Styrene	ND	1.9	0.53	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	0.36	ug/kg	
127-18-4	Tetrachloroethene	ND	1.9	0.43	ug/kg	
108-88-3	Toluene	ND	0.93	0.35	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	4.6	0.93	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	4.6	0.93	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.9	0.40	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.9	0.32	ug/kg	
79-01-6	Trichloroethene	ND	0.93	0.71	ug/kg	
75-69-4	Trichlorofluoromethane	ND	4.6	0.63	ug/kg	
75-01-4	Vinyl chloride	ND	1.9	0.44	ug/kg	
	m,p-Xylene	ND	0.93	0.69	ug/kg	
95-47-6	o-Xylene	ND	0.93	0.54	ug/kg	
1330-20-7	Xylene (total)	ND	0.93	0.54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		75-127%
17060-07-0	1,2-Dichloroethane-D4	103%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	98%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

- (a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory out of hold time.
- (b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-15		Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58562.D	1	04/17/19 13:19	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	65	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	28	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	58	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	35	ug/kg	
95-48-7	2-Methylphenol	ND	65	21	ug/kg	
	3&4-Methylphenol	ND	65	27	ug/kg	
88-75-5	2-Nitrophenol	ND	160	22	ug/kg	
100-02-7	4-Nitrophenol	ND	330	87	ug/kg	
87-86-5	Pentachlorophenol	ND	130	31	ug/kg	
108-95-2	Phenol	ND	65	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	22	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	24	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	19	ug/kg	
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
98-86-2	Acetophenone	ND	160	7.0	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
1912-24-9	Atrazine	ND	65	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	33	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	65	13	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	65	8.0	ug/kg	
92-52-4	1,1'-Biphenyl	ND	65	4.5	ug/kg	
100-52-7	Benzaldehyde	ND	160	8.1	ug/kg	
91-58-7	2-Chloronaphthalene	ND	65	7.8	ug/kg	
106-47-8	4-Chloroaniline	ND	160	12	ug/kg	
86-74-8	Carbazole	ND	65	4.7	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-15	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-15A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.6
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	65	13	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	65	7.0	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	65	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	65	12	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	65	11	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	33	10	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	33	16	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	65	27	ug/kg	
123-91-1	1,4-Dioxane	ND	33	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	14	ug/kg	
132-64-9	Dibenzofuran	ND	65	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	65	5.3	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	65	8.1	ug/kg	
84-66-2	Diethyl phthalate	ND	65	7.0	ug/kg	
131-11-3	Dimethyl phthalate	ND	65	5.8	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	65	7.7	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	65	8.3	ug/kg	
87-68-3	Hexachlorobutadiene	ND	33	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	330	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
78-59-1	Isophorone	ND	65	7.0	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	7.4	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.7	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.2	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.5	ug/kg	
91-20-3	Naphthalene	ND	33	9.2	ug/kg	
98-95-3	Nitrobenzene	ND	65	13	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	65	9.5	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	10	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-15 Lab Sample ID: JC86307-15A Matrix: SO - Soil Method: SW846 8270D SW846 3546 Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/12/19 Date Received: 04/12/19 Percent Solids: 99.6
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ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	75%		27-114%
118-79-6	2,4,6-Tribromophenol	59%		19-152%
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	72%		39-124%
1718-51-0	Terphenyl-d14	80%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3300	ug/kg	J R
	system artifact/aldol-condensation	2.49	160	ug/kg	JN
	Total TIC, Semi-Volatile		0	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.15
4

Report of Analysis

Client Sample ID: RB-15		Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6G64246.D	1	04/16/19 15:25	MH	04/16/19 06:30	OP19758	G6G1980
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	16.5 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.61	0.50	ug/kg	
319-84-6	alpha-BHC	ND	0.61	0.49	ug/kg	
319-85-7	beta-BHC	ND	0.61	0.55	ug/kg	
319-86-8	delta-BHC	ND	0.61	0.58	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.61	0.45	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.61	0.49	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.61	0.28	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.61	0.28	ug/kg	
60-57-1	Dieldrin	ND	0.61	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	0.61	0.56	ug/kg	
72-55-9	4,4'-DDE	ND	0.61	0.53	ug/kg	
50-29-3	4,4'-DDT	ND	0.61	0.54	ug/kg	
72-20-8	Endrin	ND	0.61	0.47	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.61	0.48	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.61	0.35	ug/kg	
959-98-8	Endosulfan-I	ND	0.61	0.35	ug/kg	
33213-65-9	Endosulfan-II	ND	0.61	0.38	ug/kg	
76-44-8	Heptachlor	ND	0.61	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.61	0.43	ug/kg	
72-43-5	Methoxychlor	ND	1.2	0.48	ug/kg	
53494-70-5	Endrin ketone	ND	0.61	0.44	ug/kg	
8001-35-2	Toxaphene	ND	15	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	59%		25-135%
877-09-8	Tetrachloro-m-xylene	58%		25-135%
2051-24-3	Decachlorobiphenyl	62%		10-156%
2051-24-3	Decachlorobiphenyl	68%		10-156%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-15		Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178513.D	1	04/16/19 22:24	CP	04/16/19 02:00	OP19757	G2G4633
Run #2							

Run #	Initial Weight	Final Volume
Run #1	16.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	30	14	ug/kg	
11104-28-2	Aroclor 1221	ND	30	16	ug/kg	
11141-16-5	Aroclor 1232	ND	30	23	ug/kg	
53469-21-9	Aroclor 1242	ND	30	12	ug/kg	
12672-29-6	Aroclor 1248	ND	30	27	ug/kg	
11097-69-1	Aroclor 1254	ND	30	16	ug/kg	
11096-82-5	Aroclor 1260 ^a	ND	30	13	ug/kg	
11100-14-4	Aroclor 1268	ND	30	13	ug/kg	
37324-23-5	Aroclor 1262	ND	30	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		31-146%
877-09-8	Tetrachloro-m-xylene	76%		31-146%
2051-24-3	Decachlorobiphenyl	89%		17-164%
2051-24-3	Decachlorobiphenyl	99%		17-164%

(a) Associated CCV outside of control limits low.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	RB-15	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-15A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.6
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Y61671.D	1	04/18/19 13:19	RK	04/18/19 09:30	OP19831	G4Y2136
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.1 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28) ^a	ND UJ	6.6	2.0	mg/kg	
	EPH (> C28-C40) ^a	ND UJ	6.6	2.0	mg/kg	
	Total EPH (C9-C40) ^a	ND UJ	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	86%		40-140%
3386-33-2	1-Chlorooctadecane	92%		40-140%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-15		Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	25400	49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	38.4	20	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.20	0.20	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.49	0.49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	17200	490	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	57.8	0.98	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	15.5	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	77.1	2.5	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	12700	49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.8	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	7300	490	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	170	1.5	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.030	0.030	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	23.2	3.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	1020	980	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 2.0	2.0	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.49	0.49	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	3590	980	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.98	0.98	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	35.2	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	27.3	4.9	mg/kg	1	04/15/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14240

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: RB-15	Date Sampled: 04/12/19
Lab Sample ID: JC86307-15A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.24	0.24	mg/kg	1	04/17/19 16:33	KI	SW846 9012B/LACHAT

RL = Reporting Limit

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Report of Analysis

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Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	C225069.D	1	04/17/19 12:02	RS	04/15/19 21:00	n/a	VC8395
Run #2							

Run #	Initial Weight
Run #1	7.2 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	3.7	7.0	3.5	ug/kg	J
71-43-2	Benzene	ND	0.35	0.26	ug/kg	
74-97-5	Bromochloromethane	ND	3.5	0.30	ug/kg	
75-27-4	Bromodichloromethane	ND	1.4	0.31	ug/kg	
75-25-2	Bromoform	ND	3.5	0.28	ug/kg	
74-83-9	Bromomethane ^b	ND UJ	3.5	0.70	ug/kg	
78-93-3	2-Butanone (MEK)	ND	7.0	2.6	ug/kg	
75-15-0	Carbon disulfide	ND	1.4	0.65	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.4	0.38	ug/kg	
108-90-7	Chlorobenzene	ND	1.4	0.25	ug/kg	
75-00-3	Chloroethane	ND	3.5	0.48	ug/kg	
67-66-3	Chloroform	ND	1.4	0.26	ug/kg	
74-87-3	Chloromethane	ND	3.5	1.4	ug/kg	
110-82-7	Cyclohexane	ND	1.4	0.28	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.4	0.58	ug/kg	
124-48-1	Dibromochloromethane	ND	1.4	0.24	ug/kg	
106-93-4	1,2-Dibromoethane	ND	0.70	0.23	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	0.70	0.21	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	0.70	0.25	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	0.70	0.24	ug/kg	
75-71-8	Dichlorodifluoromethane ^b	ND UJ	3.5	0.44	ug/kg	
75-34-3	1,1-Dichloroethane	ND	0.70	0.27	ug/kg	
107-06-2	1,2-Dichloroethane	ND	0.70	0.33	ug/kg	
75-35-4	1,1-Dichloroethene	ND	0.70	0.46	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	0.70	0.67	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	0.70	0.47	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.4	0.28	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.4	0.25	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.4	0.23	ug/kg	
100-41-4	Ethylbenzene	ND	0.70	0.39	ug/kg	
76-13-1	Freon 113	ND	3.5	0.53	ug/kg	
591-78-6	2-Hexanone	ND	3.5	0.89	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8260C SW846 5035		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.4	0.49	ug/kg	
79-20-9	Methyl Acetate	ND	3.5	0.97	ug/kg	
108-87-2	Methylcyclohexane	ND	1.4	0.49	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.70	0.25	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	3.5	1.1	ug/kg	
75-09-2	Methylene chloride	ND	3.5	1.7	ug/kg	
100-42-5	Styrene	ND	1.4	0.40	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.4	0.27	ug/kg	
127-18-4	Tetrachloroethene	ND	1.4	0.32	ug/kg	
108-88-3	Toluene	ND	0.70	0.26	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	3.5	0.70	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	3.5	0.70	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.4	0.30	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.4	0.24	ug/kg	
79-01-6	Trichloroethene	ND	0.70	0.53	ug/kg	
75-69-4	Trichlorofluoromethane	ND	3.5	0.48	ug/kg	
75-01-4	Vinyl chloride	ND	1.4	0.33	ug/kg	
	m,p-Xylene	ND	0.70	0.52	ug/kg	
95-47-6	o-Xylene	ND	0.70	0.41	ug/kg	
1330-20-7	Xylene (total)	ND	0.70	0.41	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		75-127%
17060-07-0	1,2-Dichloroethane-D4	105%		75-130%
2037-26-5	Toluene-D8	96%		80-120%
460-00-4	4-Bromofluorobenzene	96%		79-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

- (a) Sample was not collected per 5035A specifications. Sample preserved from intact soil by laboratory out of hold time.
- (b) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5P58563.D	1	04/17/19 13:43	CS	04/16/19 11:00	OP19781	E5P2774
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	31.6 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	64	16	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	160	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	160	27	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	160	57	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	160	120	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	160	34	ug/kg	
95-48-7	2-Methylphenol	ND	64	20	ug/kg	
	3&4-Methylphenol	ND	64	26	ug/kg	
88-75-5	2-Nitrophenol	ND	160	21	ug/kg	
100-02-7	4-Nitrophenol	ND	320	85	ug/kg	
87-86-5	Pentachlorophenol	ND	130	30	ug/kg	
108-95-2	Phenol	ND	64	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	160	21	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	160	24	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	160	19	ug/kg	
83-32-9	Acenaphthene	ND	32	11	ug/kg	
208-96-8	Acenaphthylene	ND	32	16	ug/kg	
98-86-2	Acetophenone	ND	160	6.8	ug/kg	
120-12-7	Anthracene	ND	32	20	ug/kg	
1912-24-9	Atrazine	ND	64	14	ug/kg	
56-55-3	Benzo(a)anthracene	ND	32	9.0	ug/kg	
50-32-8	Benzo(a)pyrene	ND	32	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	32	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	32	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	32	15	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	64	12	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	64	7.8	ug/kg	
92-52-4	1,1'-Biphenyl	ND	64	4.4	ug/kg	
100-52-7	Benzaldehyde	ND	160	7.9	ug/kg	
91-58-7	2-Chloronaphthalene	ND	64	7.6	ug/kg	
106-47-8	4-Chloroaniline	ND	160	11	ug/kg	
86-74-8	Carbazole	ND	64	4.6	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB-DUP-01	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-16A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	SW846 8270D SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	64	13	ug/kg	
218-01-9	Chrysene	ND	32	10	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	64	6.8	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	64	14	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	64	11	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	64	10	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	32	9.9	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	32	16	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	64	27	ug/kg	
123-91-1	1,4-Dioxane	ND	32	21	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	32	14	ug/kg	
132-64-9	Dibenzofuran	ND	64	13	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	64	5.2	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	64	7.9	ug/kg	
84-66-2	Diethyl phthalate	ND	64	6.8	ug/kg	
131-11-3	Dimethyl phthalate	ND	64	5.7	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	64	7.4	ug/kg	
206-44-0	Fluoranthene	ND	32	14	ug/kg	
86-73-7	Fluorene	ND	32	15	ug/kg	
118-74-1	Hexachlorobenzene	ND	64	8.1	ug/kg	
87-68-3	Hexachlorobutadiene	ND	32	13	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	320	13	ug/kg	
67-72-1	Hexachloroethane	ND	160	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	32	15	ug/kg	
78-59-1	Isophorone	ND	64	6.8	ug/kg	
91-57-6	2-Methylnaphthalene	ND	32	7.2	ug/kg	
88-74-4	2-Nitroaniline	ND	160	7.5	ug/kg	
99-09-2	3-Nitroaniline	ND	160	8.0	ug/kg	
100-01-6	4-Nitroaniline	ND	160	8.2	ug/kg	
91-20-3	Naphthalene	ND	32	9.0	ug/kg	
98-95-3	Nitrobenzene	ND	64	12	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	64	9.2	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	160	12	ug/kg	
85-01-8	Phenanthrene	ND	32	11	ug/kg	
129-00-0	Pyrene	ND	32	10	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	160	8.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		23-115%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8270D SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	71%		27-114%
118-79-6	2,4,6-Tribromophenol	64%		19-152%
4165-60-0	Nitrobenzene-d5	73%		26-134%
321-60-8	2-Fluorobiphenyl	72%		39-124%
1718-51-0	Terphenyl-d14	77%		36-134%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact	2.09	3300	ug/kg	J R
10544-50-0	Cyclic octaatomic sulfur	9.55	170	ug/kg	JN
	Total TIC, Semi-Volatile		170	ug/kg	JN

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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

4.16
4

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Report of Analysis

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Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8081B SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	1G152542.D	1	04/18/19 15:24	MH	04/18/19 10:00	OP19832	G1G4912
Run #2							

Run #	Initial Weight	Final Volume
Run #1	15.7 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.64	0.53	ug/kg	
319-84-6	alpha-BHC	ND	0.64	0.52	ug/kg	
319-85-7	beta-BHC	ND	0.64	0.58	ug/kg	
319-86-8	delta-BHC	ND	0.64	0.62	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	0.64	0.47	ug/kg	
5103-71-9	alpha-Chlordane	ND	0.64	0.52	ug/kg	
5103-74-2	gamma-Chlordane	ND	0.64	0.29	ug/kg	
57-74-9	Chlordane (alpha and gamma)	ND	0.64	0.29	ug/kg	
60-57-1	Dieldrin	ND	0.64	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	0.64	0.59	ug/kg	
72-55-9	4,4'-DDE	ND	0.64	0.56	ug/kg	
50-29-3	4,4'-DDT	ND	0.64	0.57	ug/kg	
72-20-8	Endrin	ND	0.64	0.50	ug/kg	
1031-07-8	Endosulfan sulfate	ND	0.64	0.50	ug/kg	
7421-93-4	Endrin aldehyde	ND	0.64	0.36	ug/kg	
959-98-8	Endosulfan-I	ND	0.64	0.37	ug/kg	
33213-65-9	Endosulfan-II	ND	0.64	0.40	ug/kg	
76-44-8	Heptachlor	ND	0.64	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	0.64	0.45	ug/kg	
72-43-5	Methoxychlor	ND	1.3	0.51	ug/kg	
53494-70-5	Endrin ketone	ND	0.64	0.46	ug/kg	
8001-35-2	Toxaphene	ND	16	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		25-135%
877-09-8	Tetrachloro-m-xylene	68%		25-135%
2051-24-3	Decachlorobiphenyl	68%		10-156%
2051-24-3	Decachlorobiphenyl	80%		10-156%

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Report of Analysis

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Client Sample ID: RB-DUP-01		Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A		Date Received: 04/12/19
Matrix: SO - Soil		Percent Solids: 99.4
Method: SW846 8082A SW846 3546		
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2G178534.D	1	04/17/19 04:20	CP	04/16/19 12:00	OP19784	G2G4633
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	15.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	32	15	ug/kg	
11104-28-2	Aroclor 1221	ND	32	17	ug/kg	
11141-16-5	Aroclor 1232	ND	32	25	ug/kg	
53469-21-9	Aroclor 1242	ND	32	13	ug/kg	
12672-29-6	Aroclor 1248	ND	32	29	ug/kg	
11097-69-1	Aroclor 1254	ND	32	17	ug/kg	
11096-82-5	Aroclor 1260	ND	32	14	ug/kg	
11100-14-4	Aroclor 1268	ND	32	14	ug/kg	
37324-23-5	Aroclor 1262	ND	32	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		31-146%
877-09-8	Tetrachloro-m-xylene	74%		31-146%
2051-24-3	Decachlorobiphenyl	82%		17-164%
2051-24-3	Decachlorobiphenyl	91%		17-164%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS LabLink@1046026 15:51 15-Jul-2019

Report of Analysis

Page 1 of 1

Client Sample ID:	RB-DUP-01	Date Sampled:	04/12/19
Lab Sample ID:	JC86307-16A	Date Received:	04/12/19
Matrix:	SO - Soil	Percent Solids:	99.4
Method:	NJDEP EPH SW846 3546		
Project:	PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Y61672.D	1	04/18/19 13:53	RK	04/18/19 09:30	OP19831	G4Y2136
Run #2							

	Initial Weight	Final Volume
Run #1	15.2 g	2.0 ml
Run #2		

NJDEP EPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	EPH (C9-C28) ^a	ND UJ	6.6	2.0	mg/kg	
	EPH (> C28-C40) ^a	ND UJ	6.6	2.0	mg/kg	
	Total EPH (C9-C40) ^a	ND UJ	6.6	2.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	95%		40-140%
3386-33-2	1-Chlorooctadecane	105%		40-140%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RB-DUP-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	26100	48	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Antimony	< 1.9	1.9	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Arsenic	< 1.9	1.9	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Barium	84.3	19	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Beryllium	< 0.19	0.19	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cadmium	< 0.48	0.48	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Calcium	18100	480	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	77.8	0.97	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Cobalt	15.2	4.8	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Copper	71.8	2.4	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Iron	13600	48	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Lead	2.7	1.9	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Magnesium	8360	480	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Manganese	163	1.5	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Mercury	< 0.032	0.032	mg/kg	1	04/16/19	04/16/19	EAL	SW846 7471B ¹ SW846 7471B ⁴
Nickel	24.8	3.9	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Potassium	1120	970	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Selenium	< 1.9	1.9	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Silver	< 0.48	0.48	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Sodium	3510	970	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Thallium	< 0.97	0.97	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	42.4	4.8	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³
Zinc	24.8	4.8	mg/kg	1	04/16/19	04/17/19	ND	SW846 6010D ² SW846 3050B ³

(1) Instrument QC Batch: MA46516

(2) Instrument QC Batch: MA46524

(3) Prep QC Batch: MP14242

(4) Prep QC Batch: MP14255

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: RB-DUP-01	Date Sampled: 04/12/19
Lab Sample ID: JC86307-16A	Date Received: 04/12/19
Matrix: SO - Soil	Percent Solids: 99.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cyanide	< 0.23	0.23	mg/kg	1	04/17/19 16:34	KI	SW846 9012B/LACHAT

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC86641, JC86706, JC86900, and JC87075

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33487R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC86641, JC86706, JC86900, and JC87075 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC86641	FB(20190418)	JC86641-1	Water	4/18/2019		X	X	X
	BS-J10D	JC86641-2	Soil	4/18/2019		X	X	X
	BS-K10	JC86641-3	Soil	4/18/2019		X	X	X
	BS-E20A	JC86641-4	Soil	4/18/2019		X	X	X
JC86706	FB(20190419)	JC86706-1	Water	4/19/2019		X	X	X
	BS-J11S	JC86706-2	Soil	4/19/2019		X	X	X
	BS-J11D	JC86706-3	Soil	4/19/2019		X	X	X
	BS-K11	JC86706-4	Soil	4/19/2019		X	X	X
	CS-K11	JC86706-5	Soil	4/19/2019		X	X	X
JC86900	FB(20190424)	JC86900-1	Water	4/24/2019		X	X	X
	BS-F20	JC86900-2	Soil	4/24/2019		X	X	X
	BS-G20	JC86900-3	Soil	4/24/2019		X	X	X
	BS-H20	JC86900-4	Soil	4/24/2019		X	X	X
	BS-I12	JC86900-5	Soil	4/24/2019		X	X	X
	BS-J12	JC86900-6	Soil	4/24/2019		X	X	X
JC87075	FB(20190426)	JC87075-1	Water	4/26/2019		X	X	X
	BS-J12D	JC87075-2	Soil	4/26/2019		X	X	X
	BS-J13	JC87075-3	Soil	4/26/2019		X	X	X
	BS-J14	JC87075-4	Soil	4/26/2019		X	X	X
	DUP-25(20190426)	JC87075-5	Soil	4/26/2019		X	X	X
	BS-J15	JC87075-6	Soil	4/26/2019	BS-J15	X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.

DATA REVIEW REPORT

3. Miscellaneous parameters include pH and redox potential.
4. SDG #JC86706, JC86900, and JC87075: Miscellaneous parameters for samples BS-J11S, BS-F20, and BS-J13 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

DATA REVIEW REPORT

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC86641 and JC86900: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC86706 and JC87075: The MS/MSD analysis performed on sample locations BS-J11S and BS-J13 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-J11S	Antimony	52.1%	56.9%
BS-J13	Antimony	59.4%	60.1%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC86641 and JC86900: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC86706 and JC87075: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-J11S and BS-J13. The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J15 / DUP-25(20190426)	Chromium	96.2	89.5	7.2%
	Trivalent Chromium	96.2	89.5	7.2%
	Nickel	210	163	25.2%
	Vanadium	33.4	33.7	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-J15 and field duplicate sample DUP-25(20190426) were acceptable.

DATA REVIEW REPORT

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC86641 and JC86900: The serial dilution analysis was not performed using a sample from these SDGs.

SDGs #JC86706 and JC87075: The serial dilution performed on sample locations BS-J11S and BS-J13 exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC86641: The MS analysis performed on sample location BS-J10D in association with the soluble and insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC86706: The MS analysis performed on sample location BS-J11S in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC86706, JC86900, and JC87075: The MS analysis performed on sample locations BS-J11S, BS-F20, and BS-J13 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-J11S	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-F20	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		
BS-J13	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	51.8%	66.1%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC86706 and JC87075: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC86900: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use ("RA" qualifier).

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC86641 and JC86706: The PDS analysis performed on sample locations BS-J10D and BS-J11S exhibited recoveries within the control limits.

SDGs #JC86900 and JC87075: The PDS analysis performed on sample locations BS-F20 and BS-J13 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-F20	Hexavalent Chromium	< 85%	< 85%
BS-J13	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC86641, JC86706, JC86900, and JC87075: The laboratory duplicate analysis performed on sample location BS-J10D, BS-J11S, BS-F20, and BS-J13 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

DATA REVIEW REPORT

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J15 / DUP-25(20190426)	Hexavalent Chromium	0.55 U	0.55 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in between the parent sample BS-J15 and field duplicate sample DUP-25(20190426).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria	
BS-F20 BS-G20 BS-H20 BS-I12 BS-J12	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory	
BS-J11S BS-J11D BS-K11 CS-K11 BS-J12D BS-J13 BS-J14 DUP-25(20190426) BS-J15		Analysis: 3 days		
BS-J11S		Analysis: 7 days		< 24 hours from collection
BS-J13		Analysis: 11 days		
BS-F20		Analysis: 13 days		

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
BS-J13	SM4500S2-A	Analysis: 11 days	7 days from collection
BS-F20		Analysis: 13 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

SDG #JC86641: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC86706, JC86900, and JC87075: The laboratory duplicate analysis performed on sample locations BS-J11S, BS-F20, and BS-J13 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-J15 / DUP-25(20190426)	Redox Potential	318	285	10.9%
	pH	7.25	7.43	2.5%

The differences in the results between the parent sample BS-J15 and field duplicate sample DUP-25(20190426) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 1, 2019

PEER REVIEW: Dennis Capria

DATE: October 3, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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TEL: 732-329-0200 FAX: 732-329-3499/3480
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E

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC86641

Client / Reporting Information		Project Information										Requested Analysis								Matrix Codes
Company Name: Arcaid		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Tantalum Vanadium								DW - Drinking Water GW - Ground Water WW - Waste Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																		
City: Newtown PA 18940		City: Jersey City, NJ																		
Project Contact: Kristen Mastrolola		Project #: NP000770.0003.00008																		
Phone #: 610.755.7080		Client Purchase Order #										LAB USE ONLY								
Sample Name(s): Christa Cifelli		Project Manager: Jim McLaughlin, Jr.																		
SGS Sample #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	ISO	NaOH	HNO3	H2O2	NONE	DI Water	MECH	ENCLOSURE				
1	FB(20190418)		4/18/19	0900	CC	G	FB	2												
2	BS - J10D		4/18/19	1000	CC	G	SO	1												
3	BS - K10		4/18/19	1015	CC	G	SO	1												
4	BS - E20A		4/18/19	1330	CC	G	SO	1												
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions								
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other: _____		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDU1 <input type="checkbox"/> DOD-QSMS INITIAL ASSESSMENT 4A only LABEL VERIFICATION _____								
All sites available via Lablink		Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Field Reports										http://www.sgs.com/en/terms-and-conditions								
Sample Custody must be documented below each time samples change possession, including courier delivery.																				
Relinquished by: Car Cifelli	Date / Time: 4/18/19 1424	Received By: [Signature]	Date / Time: 4/18/19 1424	Relinquished by: [Signature]	Date / Time: 4/18/19 1424	Received By: [Signature]	Date / Time: 4/18/19 1424	Relinquished by: [Signature]	Date / Time: 4/18/19 1424	Received By: [Signature]	Date / Time: 4/18/19 1424	Relinquished by: [Signature]	Date / Time: 4/18/19 1424	Received By: [Signature]	Date / Time: 4/18/19 1424	Received By: [Signature]				
<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact <input type="checkbox"/> Absent <input checked="" type="checkbox"/> Preserved where applicable Therm. ID: _____ On Ice: <input checked="" type="checkbox"/> Cooler Temp. °C: 20																				

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.stx



Report of Analysis

Client Sample ID: FB(20190418)		Date Sampled: 04/18/19
Lab Sample ID: JC86641-1		Date Received: 04/18/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/18/19 22:50	JO	SW846 7196A
Redox Potential Vs H2	540		mv	1	04/19/19 22:09	EB	ASTM D1498-76
pH ^a	4.79		su	1	04/18/19 18:25	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J10D	Date Sampled: 04/18/19
Lab Sample ID: JC86641-2	Date Received: 04/18/19
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50	0.46	mg/kg	1	04/19/19 16:20	NV	SW846 3060A/7196A
Redox Potential Vs H2	371		mv	1	04/19/19 23:11	EB	ASTM D1498-76M
Solids, Percent	87.8		%	1	04/19/19 09:00	RC	SM2540 G 18TH ED MOD
pH	6.15		su	1	04/19/19 22:40	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K10	Date Sampled: 04/18/19
Lab Sample ID: JC86641-3	Date Received: 04/18/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	04/19/19 16:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	238		mv	1	04/19/19 23:15	EB	ASTM D1498-76M
Solids, Percent	82.7		%	1	04/19/19 09:00	RC	SM2540 G 18TH ED MOD
pH	5.64		su	1	04/19/19 22:42	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E20A	Date Sampled: 04/18/19
Lab Sample ID: JC86641-4	Date Received: 04/18/19
Matrix: SO - Soil	Percent Solids: 68.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	14.2	0.58	mg/kg	1	04/19/19 16:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	247		mv	1	04/19/19 23:21	EB	ASTM D1498-76M
Solids, Percent	68.7		%	1	04/19/19 09:00	RC	SM2540 G 18TH ED MOD
pH	6.13		su	1	04/19/19 22:56	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190418)		Date Sampled: 04/18/19
Lab Sample ID: JC86641-1A		Date Received: 04/18/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/19/19	04/19/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/19/19	04/19/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/19/19	04/19/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/19/19	04/19/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/19/19	04/19/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46544

(2) Prep QC Batch: MP14377

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190418)		Date Sampled: 04/18/19
Lab Sample ID: JC86641-1A		Date Received: 04/18/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/19/19 16:45	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J10D Lab Sample ID: JC86641-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/18/19 Date Received: 04/18/19 Percent Solids: 87.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	15.0	1.1	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.2	4.4	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.9	5.5	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46544

(2) Prep QC Batch: MP14349

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J10D	Date Sampled: 04/18/19
Lab Sample ID: JC86641-2A	Date Received: 04/18/19
Matrix: SO - Soil	Percent Solids: 87.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.5	1.6	mg/kg	1	04/20/19 01:10	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-K10		Date Sampled: 04/18/19
Lab Sample ID: JC86641-3A		Date Received: 04/18/19
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.8	4.8	mg/kg	2	04/19/19	04/22/19 ND	SW846 6010D ²	SW846 3050B ³
Chromium	16.8	1.2	mg/kg	1	04/19/19	04/20/19 GT	SW846 6010D ¹	SW846 3050B ³
Nickel	12.1	4.8	mg/kg	1	04/19/19	04/20/19 GT	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.4	2.4	mg/kg	2	04/19/19	04/22/19 ND	SW846 6010D ²	SW846 3050B ³
Vanadium	27.2	6.0	mg/kg	1	04/19/19	04/20/19 GT	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46544
- (2) Instrument QC Batch: MA46553
- (3) Prep QC Batch: MP14349

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K10		Date Sampled: 04/18/19
Lab Sample ID: JC86641-3A		Date Received: 04/18/19
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.8	1.7	mg/kg	1	04/20/19 01:15	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E20A		Date Sampled: 04/18/19
Lab Sample ID: JC86641-4A		Date Received: 04/18/19
Matrix: SO - Soil		Percent Solids: 68.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9	2.9	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	16.3	1.4	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	13.8	5.7	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	24.4	7.1	mg/kg	1	04/19/19	04/20/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46544

(2) Prep QC Batch: MP14349

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E20A	Date Sampled: 04/18/19
Lab Sample ID: JC86641-4A	Date Received: 04/18/19
Matrix: SO - Soil	Percent Solids: 68.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	2.1	2.0	mg/kg	1	04/20/19 01:20	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

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www.sgs.com/ehausa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	JC86706

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes																																																																																																																							
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		<table border="1"> <tr><td>Total Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Trivalent Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Hexavalent Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Antimony</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Nickel</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Thallium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Vanadium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>												Total Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Trivalent Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Hexavalent Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water UW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																											
Trivalent Chromium	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																											
Hexavalent Chromium	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																											
Antimony	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																											
Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																							
Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																							
Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																							
Street Address: 10 Friends Lane		Street: 16 Chapel Ave																																																																																																																																					
City: Newton PA		City: Jersey City NJ																																																																																																																																					
Project Contact: Krista Matrecoia		Project #: NP000370.0003																																																																																																																																					
Phone #: 610.755.7080		Client Purchase Order #:																																																																																																																																					
Sample(s) Name(s): Chrston CiFelli		Project Manager: Jim McLaughlin J		Number of preserved bottles												LAB USE ONLY																																																																																																																							
SGS Series #	Field ID / Point of Collection	MECHDI Val #	Date	Time	Sampled by	Q10 (ID) (Core ID)	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	H ₂ O ₂	Li Water	MEQA		ENCOB																																																																																																																						
1	FB(20190419)		4/19/19	0900	CC	G	FB	2																																																																																																																															
2	BS-311S		4/19/19	1210	CC	G	SO	1																																																																																																																															
3	BS-311D		4/19/19	1220	CC	G	SO	1																																																																																																																															
4	BS-K11		4/19/19	1330	CC	G	SO	1																																																																																																																															
2	BS-311SMS		4/19/19	1210	CC	G	SO	1																																																																																																																															
	BS-311SMSB		4/19/19	1210	CC	G	SO	1																																																																																																																															
5	CS-K11		4/19/19	1245	CC	G	O	1																																																																																																																															

Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other <small>*All data available via LabLink</small>	Approved By (SGS PM) / Date:	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EDUW	INITIAL ASSESSMENT 3B LABEL VERIFICATION _____ <small>http://www.sgs.com/en/terms-and-conditions</small>	

Sample custody must be documented below each time samples change possession, including courier delivery.					
Relinquished by: [Signature]	Date / Time: 4/19/19 1440	Received By: [Signature]	Date / Time: 4/19/19 1440	Relinquished by: [Signature]	Date / Time: 4/19/19 1634
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:
Relinquished by:	Date / Time:	Received By:	Date / Time:	Custody Seal # 12422	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent Therm. ID: [Signature] Cooler Temp: [Signature]

EHSQAQC-0023-02-FORM-Dayton - Standard COC.xlsx



5.2
5

3.1

Report of Analysis

Client Sample ID: FB(20190419)		Date Sampled: 04/19/19
Lab Sample ID: JC86706-1		Date Received: 04/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/19/19 21:52	JO	SW846 7196A
Redox Potential Vs H2	534		mv	1	04/23/19 15:08	EB	ASTM D1498-76
pH ^a	5.36		su	1	04/19/19 17:15	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J11S	Date Sampled: 04/19/19
Lab Sample ID: JC86706-2	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	04/23/19 12:02	RI	SW846 3060A/7196A
Redox Potential Vs H2	257		mv	1	04/22/19 23:07	EB	ASTM D1498-76M
Solids, Percent	82.3		%	1	04/20/19 10:50	RC	SM2540 G 18TH ED MOD
pH	6.22 J		su	1	04/22/19 22:40	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J11D	Date Sampled: 04/19/19
Lab Sample ID: JC86706-3	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	04/23/19 12:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	04/22/19 23:13	EB	ASTM D1498-76M
Solids, Percent	86.6		%	1	04/20/19 10:50	RC	SM2540 G 18TH ED MOD
pH	6.56 J		su	1	04/22/19 22:47	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-4	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	04/23/19 12:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	221		mv	1	04/22/19 23:29	EB	ASTM D1498-76M
Solids, Percent	79.8		%	1	04/20/19 10:50	RC	SM2540 G 18TH ED MOD
pH	6.11 J		su	1	04/22/19 22:50	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-5	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	04/23/19 12:08	RI	SW846 3060A/7196A
Redox Potential Vs H2	274		mv	1	04/22/19 23:35	EB	ASTM D1498-76M
Solids, Percent	75		%	1	04/20/19 10:50	RC	SM2540 G 18TH ED MOD
pH	5.87 J		su	1	04/22/19 22:51	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J11S	Date Sampled: 04/19/19
Lab Sample ID: JC86706-2R	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	04/25/19 16:30	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J11S	Date Sampled: 04/19/19
Lab Sample ID: JC86706-2RT	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	04/26/19 12:00	MP	ASTM D3872-86
Sulfide Screen	NEGATIVE			1	04/26/19 09:00	MP	SM4500S2- A-11
Total Organic Carbon	1390	120	mg/kg	1	05/01/19 19:03	JO	LLOYD KAHN 1988 MOD

(a) Fe2 was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J11D	Date Sampled: 04/19/19
Lab Sample ID: JC86706-3R	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	04/25/19 16:33	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-4R	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	04/25/19 16:33	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-5R	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53	0.53	mg/kg	1	04/25/19 16:33	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20190419) Lab Sample ID: JC86706-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/19/19 Date Received: 04/19/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46553

(2) Prep QC Batch: MP14415

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190419)	Date Sampled: 04/19/19
Lab Sample ID: JC86706-1A	Date Received: 04/19/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/22/19 12:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J11S	Date Sampled: 04/19/19
Lab Sample ID: JC86706-2A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	19.1	1.2	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.3	4.9	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	6.1	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46557

(2) Prep QC Batch: MP14411

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J11S	Date Sampled: 04/19/19
Lab Sample ID: JC86706-2A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.1	1.7	mg/kg	1	04/22/19 16:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J11D	Date Sampled: 04/19/19
Lab Sample ID: JC86706-3A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	17.9	1.1	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	17.7	4.4	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.5	5.5	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46557

(2) Prep QC Batch: MP14411

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J11D	Date Sampled: 04/19/19
Lab Sample ID: JC86706-3A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.9	1.6	mg/kg	1	04/22/19 16:56	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-4A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	18.1	1.3	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	15.9	5.2	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.9	3.9	mg/kg	3	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.7	6.5	mg/kg	1	04/20/19	04/22/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46557

(2) Prep QC Batch: MP14411

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-4A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.1	1.8	mg/kg	1	04/22/19 17:01	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-5A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	04/20/19	04/22/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	63.3	1.3	mg/kg	1	04/20/19	04/22/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	77.7	5.1	mg/kg	1	04/20/19	04/22/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium ^a	< 6.4	6.4	mg/kg	5	04/20/19	04/22/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	22.0	6.4	mg/kg	1	04/20/19	04/22/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46557

(2) Prep QC Batch: MP14411

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-5A	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	63.3	1.8	mg/kg	1	04/22/19 17:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-4AR	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	< 0.31	0.31	mg/kg	5	04/25/19	04/25/19 ZC	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46593

(2) Prep QC Batch: MP14495A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-K11	Date Sampled: 04/19/19
Lab Sample ID: JC86706-5AR	Date Received: 04/19/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	< 0.32	0.32	mg/kg	5	04/25/19	04/25/19 ZC	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46593

(2) Prep QC Batch: MP14495A

RL = Reporting Limit

4.2
4



50
PB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

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FED-EX Tracking #	Order Control #
SGS Quote #	SGS Job #

JC86900

Client / Reporting Information		Project Information						Requested Analysis										Matrix Codes																																																																																																																
Company Name: ARCADIS		Project Name: PPG Jersey City Site 107						<table border="1"> <tr><td>Total Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Trivalent Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Hexavalent Chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Antimony</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Nickel</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Thallium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Vanadium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>										Total Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Trivalent Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Hexavalent Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	X	X	X	X	X	X	X											X	X	X	X	X	X	X	X																																																																																																									
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Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																																																																																																																																
City, State, Zip: Newton NJ		City, State, Zip: Jersey City NJ																																																																																																																																
Project Contact: Krista Mastroluca		Project #: NP000772.0003																																																																																																																																
Phone #: 610.755.7080		Client Purchase Order #:																																																																																																																																
Sampler(s) Name(s): Christa C. Gill		Project Manager: Jim McLaughlin, Jr.																																																																																																																																
SGS Sample #	Field ID / Point of Collection	MECH/VI	Date	Time	Sampled by	Grav (g) (Comp. C)	Matrix	# of bottles	HC	MSDP	HAZ	TSS/D	NOISE	D/Water	MECH	RECORD	LAB USE ONLY																																																																																																																	
1	FB(20190424)		4/24/19	0730	CC	G	FB	2																																																																																																																										
2	BS - F20		4/24/19	0915	CC	G	SO	1									A22																																																																																																																	
3	BS - G20		4/24/19	0930	CC	G	SO	1									M25																																																																																																																	
4	BS - H20		4/24/19	1000	CC	G	SO	1																																																																																																																										
5	BS - J12		4/24/19	1345	CC	G	SO	1									P14																																																																																																																	
6	BS - J12		4/24/19	1406	CC	G	SO	1																																																																																																																										

5.2
5

Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 9 Business Days <input type="checkbox"/> 8 Business Days <input checked="" type="checkbox"/> 7 Business Days <input type="checkbox"/> 6 Business Days <input type="checkbox"/> Other _____	Approved By (SGS PM): / Date:	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQV1	<input type="checkbox"/> DOD-QSMS INITIAL ASSESSMENT 3/12/20 LABEL VERIFICATION	

http://www.sgs.com/en/terms-and-conditions

Relinquished by: 1 CC	Date / Time: 4/24/19 1410	Received By: 1 SCM	Date / Time: 4/24/19 210	Relinquished by: 2 SCM	Date / Time: 4/24/19	Received By: 2 CC
Relinquished by: 3	Date / Time:	Received By: 3	Date / Time:	Relinquished by: 4	Date / Time:	Received By: 4
Relinquished by: 5	Date / Time:	Received By: 5	Date / Time:	Custody Seal #	18754	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent Therm ID: On Ice: <input checked="" type="checkbox"/> Cooler Temp. °C:

CIP

3/1



Report of Analysis

Client Sample ID: FB(20190424)		Date Sampled: 04/24/19
Lab Sample ID: JC86900-1		Date Received: 04/24/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/24/19 22:40	JO	SW846 7196A
Redox Potential Vs H2	490		mv	1	04/26/19 18:26	JOO	ASTM D1498-76
pH ^a	6.17		su	1	04/24/19 17:32	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-2	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 63.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 RA	0.63	mg/kg	1	04/26/19 10:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	249		mv	1	04/26/19 17:57	JOO	ASTM D1498-76M
Solids, Percent	63.2		%	1	04/25/19 08:34	RC	SM2540 G 18TH ED MOD
pH	7.33 J		su	1	04/26/19 17:57	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-3	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62 RA	0.56	mg/kg	1	04/26/19 11:13	NV	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	04/26/19 17:59	JOO	ASTM D1498-76M
Solids, Percent	71.9		%	1	04/25/19 08:34	RC	SM2540 G 18TH ED MOD
pH	6.78 J		su	1	04/26/19 17:59	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H20		Date Sampled: 04/24/19
Lab Sample ID: JC86900-4		Date Received: 04/24/19
Matrix: SO - Soil		Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64 RA	0.64	mg/kg	1	04/26/19 11:13	NV	SW846 3060A/7196A
Redox Potential Vs H2	183		mv	1	04/26/19 18:15	JOO	ASTM D1498-76M
Solids, Percent	62.8		%	1	04/25/19 08:34	RC	SM2540 G 18TH ED MOD
pH	6.83 J		su	1	04/26/19 18:15	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-5	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 RA	0.53	mg/kg	1	04/26/19 11:13	NV	SW846 3060A/7196A
Redox Potential Vs H2	195		mv	1	04/26/19 18:17	JOO	ASTM D1498-76M
Solids, Percent	75		%	1	04/25/19 08:34	RC	SM2540 G 18TH ED MOD
pH	6.90 J		su	1	04/26/19 18:17	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-6	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 RA	0.51	mg/kg	1	04/26/19 11:13	NV	SW846 3060A/7196A
Redox Potential Vs H2	184		mv	1	04/26/19 18:21	JOO	ASTM D1498-76M
Solids, Percent	78.2		%	1	04/25/19 08:34	RC	SM2540 G 18TH ED MOD
pH	7.11 J		su	1	04/26/19 18:21	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-2R	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 63.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88 RA	0.63	mg/kg	1	05/01/19 13:05	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-3R	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74 RA	0.56	mg/kg	1	05/01/19 13:14	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-4R	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 RA	0.64	mg/kg	1	05/01/19 13:14	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-5R	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 RA	0.53	mg/kg	1	05/01/19 13:14	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-6R	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.53 RA	0.51	mg/kg	1	05/01/19 13:14	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-2RT	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 63.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	2.2 J	0.20	%	1	05/07/19 12:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	05/07/19 12:45	MP	SM4500S2- A-11
Total Organic Carbon	48800	160	mg/kg	1	05/06/19 16:57	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190424) Lab Sample ID: JC86900-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/24/19 Date Received: 04/24/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14556

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190424)	Date Sampled: 04/24/19
Lab Sample ID: JC86900-1A	Date Received: 04/24/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/25/19 20:14	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-2A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 63.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2	3.2	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	23.0	1.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	22.7	6.5	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.4	8.1	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14558

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-2A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 63.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	2.2	mg/kg	1	04/25/19 19:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-3A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10.2	1.4	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	9.0	5.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.8	7.0	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14558

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-3A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.6	2.0	mg/kg	1	04/25/19 19:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H20 Lab Sample ID: JC86900-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 04/24/19 Date Received: 04/24/19 Percent Solids: 62.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.7	1.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	21.1	6.2	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9	7.8	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14558

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H20	Date Sampled: 04/24/19
Lab Sample ID: JC86900-4A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.2	2.2	mg/kg	1	04/25/19 19:42	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-5A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	04/25/19	04/25/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.9	1.3	mg/kg	1	04/25/19	04/25/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.6	5.1	mg/kg	1	04/25/19	04/25/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/25/19	04/25/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.8	6.4	mg/kg	1	04/25/19	04/25/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14558

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-I12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-5A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 75.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.5	1.8	mg/kg	1	04/25/19 19:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-6A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	14.0	1.3	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	14.2	5.2	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.6	6.5	mg/kg	1	04/25/19	04/25/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46587

(2) Prep QC Batch: MP14558

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12	Date Sampled: 04/24/19
Lab Sample ID: JC86900-6A	Date Received: 04/24/19
Matrix: SO - Soil	Percent Solids: 78.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.0	1.8	mg/kg	1	04/25/19 19:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehausa

E

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes			
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CR - CR LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																	
City: Newtown PA 18940		City: Jersey City, NJ																	
Project Contact: Krista Moshakala		Project #: N80007700003																	
Phone #: 610.755.7080		Client Purchase Order #:																	
Sample(s) Name(s): Christa P. Felli		Project Manager: Jim McLaughlin, Jr.																	
SGS Sample #	Field ID / Point of Collection	MEQ/NDL Vol #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	HU	MS/PH	MS/DO	MS/CO ₂	MS/NO ₃	MS/NO ₂	MS/AMMONIA	MS/CHLORIDE	MS/SULFIDE	MS/OTHER	LAB USE ONLY
1	FB(20190426)		4/26/19	0815	CC	G	FB	2											
2	BS-J12D		4/26/19	0830	CC	G	SO	1											
3	BS-J13MS		4/26/19	0900	CC	G	SO	1											A37
4	BS-J13MSD		4/26/19	0900	CC	G	SO	1											G25
5	BS-J13		4/26/19	0900	CC	G	SO	1											
6	BS-J14		4/26/19	0915	CC	G	SO	1											
7	DUP-25(20190426)		4/26/19	-	CC	G	SO	1											D47
8	BS-J15		4/26/19	1030	CC	G	SO	1											

5.2
5

Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: _____		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQW		<input type="checkbox"/> DOD-QSMS BS-J13 = MS/MSD		Comments / Special Instructions http://www.sgs.com/en/terms-and-conditions	
Requisitioned by: [Signature] Date / Time: 4/26/19 1435		Received By: [Signature] Date / Time: 4/26/19 1555		Requisitioned by: [Signature] Date / Time: 4/26/19		Received By: [Signature] Date / Time: 4/26/19		Custody Seal # 23216 <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		Preserved where applicable <input type="checkbox"/> Absent <input type="checkbox"/> Therm. ID: XIP 32.0	

Initial Assessment **3A12P**
Label Verification _____
Label Verification _____
Initial Assessment _____

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-1	Date Received: 04/26/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	04/26/19 23:25	JO	SW846 7196A
Redox Potential Vs H2	595		mv	1	04/29/19 21:23	EB	ASTM D1498-76
pH ^a	5.79		su	1	04/26/19 17:10	RS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12D	Date Sampled: 04/26/19
Lab Sample ID: JC87075-2	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 55.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.72 UJ-	0.72	mg/kg	1	04/30/19 12:23	RI	SW846 3060A/7196A
Redox Potential Vs H2	263		mv	1	04/29/19 22:15	EB	ASTM D1498-76M
Solids, Percent	55.5		%	1	04/27/19 12:57	RC	SM2540 G 18TH ED MOD
pH	7.23 J		su	1	04/29/19 21:39	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J13	Date Sampled: 04/26/19
Lab Sample ID: JC87075-3	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	04/30/19 12:17	RI	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	04/29/19 22:10	EB	ASTM D1498-76M
Solids, Percent	72.4		%	1	04/27/19 12:57	RC	SM2540 G 18TH ED MOD
pH	7.50 J		su	1	04/29/19 21:34	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J14	Date Sampled: 04/26/19
Lab Sample ID: JC87075-4	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	04/30/19 12:23	RI	SW846 3060A/7196A
Redox Potential Vs H2	319		mv	1	04/29/19 22:19	EB	ASTM D1498-76M
Solids, Percent	71.9		%	1	04/27/19 12:57	RC	SM2540 G 18TH ED MOD
pH	7.45 J		su	1	04/29/19 21:44	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-25(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-5	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	04/30/19 12:23	RI	SW846 3060A/7196A
Redox Potential Vs H2	285		mv	1	04/29/19 22:23	EB	ASTM D1498-76M
Solids, Percent	72.8		%	1	04/27/19 12:57	RC	SM2540 G 18TH ED MOD
pH	7.43 J		su	1	04/29/19 21:46	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 04/26/19
Lab Sample ID: JC87075-6	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 73.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	04/30/19 12:23	RI	SW846 3060A/7196A
Redox Potential Vs H2	318		mv	1	04/29/19 22:30	EB	ASTM D1498-76M
Solids, Percent	73.2		%	1	04/27/19 12:57	RC	SM2540 G 18TH ED MOD
pH	7.25 J		su	1	04/29/19 21:51	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12D	Date Sampled: 04/26/19
Lab Sample ID: JC87075-2R	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 55.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.72	0.72	mg/kg	1	05/02/19 12:43	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J13	Date Sampled: 04/26/19
Lab Sample ID: JC87075-3R	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	05/02/19 12:38	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J14	Date Sampled: 04/26/19
Lab Sample ID: JC87075-4R	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	05/02/19 12:43	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-25(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-5R	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	05/02/19 12:43	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 04/26/19
Lab Sample ID: JC87075-6R	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 73.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	05/02/19 12:43	RI	SW846-3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-J13		Date Sampled: 04/26/19
Lab Sample ID: JC87075-3RT		Date Received: 04/26/19
Matrix: SO - Soil		Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.3 J	0.20	%	1	05/07/19 12:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	05/07/19 12:45	MP	SM4500S2- A-11
Total Organic Carbon	427000	140	mg/kg	1	05/07/19 16:46	JO	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190426)		Date Sampled: 04/26/19
Lab Sample ID: JC87075-1A		Date Received: 04/26/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14614

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-1A	Date Received: 04/26/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	04/29/19 20:35	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J12D	Date Sampled: 04/26/19
Lab Sample ID: JC87075-2A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 55.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.4 J-	2.0	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	159	3.0	mg/kg	3	04/29/19	04/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	1990	12	mg/kg	3	04/29/19	04/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.0	3.0	mg/kg	3	04/29/19	04/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	45.6	4.9	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14616

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J12D	Date Sampled: 04/26/19
Lab Sample ID: JC87075-2A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 55.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	159	3.7	mg/kg	1	04/30/19 09:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J13	Date Sampled: 04/26/19
Lab Sample ID: JC87075-3A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	04/29/19	04/30/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	216	1.3	mg/kg	1	04/29/19	04/30/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	67.4	5.4	mg/kg	1	04/29/19	04/30/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/29/19	04/30/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	43.0	6.7	mg/kg	1	04/29/19	04/30/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14616

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J13	Date Sampled: 04/26/19
Lab Sample ID: JC87075-3A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	216	1.9	mg/kg	1	04/30/19 09:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J14	Date Sampled: 04/26/19
Lab Sample ID: JC87075-4A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.9 J-	2.7	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	92.0	1.4	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	356	5.4	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.5	6.8	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14616

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J14	Date Sampled: 04/26/19
Lab Sample ID: JC87075-4A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 71.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	92.0	2.0	mg/kg	1	04/29/19 21:26	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-25(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-5A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	04/29/19	04/29/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	89.5	1.3	mg/kg	1	04/29/19	04/29/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	163	5.3	mg/kg	1	04/29/19	04/29/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	04/29/19	04/29/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	33.7	6.6	mg/kg	1	04/29/19	04/29/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14616

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-25(20190426)	Date Sampled: 04/26/19
Lab Sample ID: JC87075-5A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	89.5	1.9	mg/kg	1	04/29/19 21:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 04/26/19
Lab Sample ID: JC87075-6A	Date Received: 04/26/19
Matrix: SO - Soil	Percent Solids: 73.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	96.2	1.4	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	210	5.6	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.4	7.0	mg/kg	1	04/29/19	04/29/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46611

(2) Prep QC Batch: MP14616

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J15		Date Sampled: 04/26/19
Lab Sample ID: JC87075-6A		Date Received: 04/26/19
Matrix: SO - Soil		Percent Solids: 73.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	96.2	2.0	mg/kg	1	04/29/19 21:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC89030

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #33503R

Review Level: Tier III

Project: 30017557.2A000.ANA / NP000770.0003.2A000

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC89030 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis			
					Cr VI	MET	SPLP MET	MISC
FB(20190530)	JC89030-1	Water	5/31/2019		X	X		X
SW-34(0.0-0.5)	JC89030-2	Soil	5/31/2019		X	X		X
SW-34(1.5-2.0)	JC89030-3	Soil	5/31/2019		X	X	X	X
SW-35(0.0-0.5)	JC89030-4	Soil	5/31/2019		X	X	X	X
SW-35(2.0-2.5)	JC89030-5	Soil	5/31/2019		X	X		X
SW-35(4.0-4.5)	JC89030-6	Soil	5/31/2019		X	X	X	X
SW-35(6.0-6.5)	JC89030-7	Soil	5/31/2019		X	X		X
SW-35(8.0-8.5)	JC89030-8	Soil	5/31/2019		X	X		X
SW-35(9.0-9.5)	JC89030-9	Soil	5/31/2019		X	X		X
DUP-27(20190531)	JC89030-10	Soil	5/31/2019	SW-35(9.0-9.5)	X	X		X
SW-36(0.0-0.5)	JC89030-11	Soil	5/31/2019		X	X		X
SW-36(2.0-2.5)	JC89030-12	Soil	5/31/2019		X	X		X
SW-36(4.0-4.5)	JC89030-13	Soil	5/31/2019		X	X		X
SW-36(6.0-6.5)	JC89030-14	Soil	5/31/2019		X	X		X
SW-36(8.0-8.5)	JC89030-15	Soil	5/31/2019		X	X		X
BS-H27	JC89030-16	Soil	5/31/2019		X	X		X
BS-G27	JC89030-17	Soil	5/31/2019		X	X		X
BS-F27	JC89030-18	Soil	5/31/2019		X	X		X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for sample SW-36(6.0-6.5) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

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ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

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INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010D, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010D	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil/SPLP Leachate	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil/SPLP Leachate	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

Note that sample SW-36(8.0-8.5) was reanalyzed for thallium by method SW-846 6020B; all other metals analyses were performed using method SW-846 6010D.

Note that samples SW-34(1.5-2.0), SW-35(0.0-0.5), and SW-35(4.0-4.5) were re-prepared and reanalyzed for total metals by SW-846 6010D and SPLP metals by method SW-846 6010D for antimony, chromium, nickel, and vanadium and by method SW-846 6020B for thallium. The reanalysis was performed in order to crush nodules observed in the sample jars.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

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All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-34(1.5-2.0) in association with the SPLP analysis exhibited recoveries within the control limits.

The MS/MSD analysis performed on sample location SW-36(8.0-8.5) in association with the SW-846 6020B analysis exhibited recoveries within the control limits.

The MS/MSD analysis performed on sample location SW-36(6.0-6.5) in association with the SW-846 6010D analysis exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-36(6.0-6.5)	Antimony	46.4%	51.0%

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The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-34(1.5-2.0), SW-36(6.0-6.5), and SW-36(8.0-8.5). The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-35(9.0-9.5) / DUP-27(20190531)	Nickel	13.0	28.0	NC
	Vanadium	22.3	43.6	
	Trivalent Chromium	7.2	87.2	
	Chromium	20.3	106	136%

Notes:

NC = Not compliant

The differences in the chromium, nickel, vanadium, and trivalent chromium results between the parent sample SW-35(9.0-9.5) and field duplicate sample DUP-27(20190531) were not in agreement. The associated results were qualified as estimated.

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7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries and RPDs within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis performed using samples SW-34(1.5-2.0), SW-36(6.0-6.5), and SW-36(8.0-8.5) exhibited %D within the control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C/6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-34(1.5-2.0) (Reanalysis) SW-35(0.0-0.5) (Reanalysis) SW-35(4.0-4.5) (Reanalysis)	SW-846 7196A	Analysis: 39 days	< 30 days from collection

Sample results were qualified as specified in the table below. All other holding times were met. The reanalysis was performed in order to crush nodules observed in the sample jars.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of

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acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-34(1.5-2.0) (Reanalysis) and SW-36(6.0-6.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-34(1.5-2.0) (Reanalysis)	Hexavalent Chromium, Soluble	50.7%	NA
	Hexavalent Chromium, Insoluble	AC (108%)	NA
SW-36(6.0-6.5)	Hexavalent Chromium, Soluble	66.9%	< 50%
	Hexavalent Chromium, Insoluble	AC (85.6%)	64.7%

Notes:

AC = Acceptable

NA = MS reanalysis not performed

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

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Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations SW-34(1.5-2.0) (Reanalysis) and SW-36(6.0-6.5) exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-34(1.5-2.0) (Reanalysis) exhibited results within the control limit.

The laboratory analysis performed on sample location SW-36(6.0-6.5) exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD	Reanalysis Laboratory Duplicate RPD
SW-36(6.0-6.5)	Hexavalent Chromium	36.4%	AC (17.4%)

Notes:

AC = Acceptable

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

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Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-35(9.0-9.5) / DUP-27(20190531)	Hexavalent Chromium	13.1	18.8	35.7%

The difference in the hexavalent chromium results between the parent sample SW-35(9.0-9.5) and field duplicate sample DUP-27(20190531) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190530)	SM4500H+B	Analysis: 4 days	< 24 hours of receipt by laboratory
SW-34(0.0-0.5)	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
SW-34(1.5-2.0)			
SW-35(0.0-0.5)			
SW-35(2.0-2.5)			
SW-35(4.0-4.5)			
SW-35(6.0-6.5)			
SW-35(8.0-8.5)			
SW-35(9.0-9.5)			
DUP-27(20190531)			
SW-36(0.0-0.5)			
SW-36(2.0-2.5)			
SW-36(4.0-4.5)			
SW-36(6.0-6.5)			
SW-36(8.0-8.5)			
BS-H27			
BS-G27			
BS-F27			

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Sample Locations	Method	Holding Time	Criteria
SW-34(1.5-2.0) (Reanalysis) SW-35(0.0-0.5) (Reanalysis) SW-35(4.0-4.5) (Reanalysis)	SW846 9045D	Analysis: 40 days	< 24 hours of receipt by laboratory
SW-36(6.0-6.5)	ASTM D3872-86	Analysis: 14 days	< 24 hours from collection
SW-36(6.0-6.5)	SM4500S2-A	Analysis: 14 days	< 7 days from collection

Sample results were qualified as specified in the table below. All other holding times were met. The reanalysis of samples SW-34(1.5-2.0), SW-35(0.0-0.5), and SW-35(4.0-4.5) was performed in order to crush nodules observed in the sample jars.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

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4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations SW-34(1.5-2.0) (Reanalysis) and SW-36(6.0-6.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-35(9.0-9.5) / DUP-27(20190531)	Redox Potential	400	401	0.2%
	pH	7.55	7.30	3.4%

The differences in the results between the parent sample SW-35(9.0-9.5) and field duplicate sample DUP-27(20190531) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: July 17, 2019

PEER REVIEW: Dennis Capria

DATE: July 18, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, and a table of sample data with columns for SSS sample #, Field ID, Date, Time, Matrix, # of bottles, and various chemical analysis results.

INITIAL ASSESSMENT 3A
LABEL VERIFICATION



5.2
5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehausa

FED-EX Tracking #
SGS Quote #
SGS Order Control #
SGS Job # JC89030

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, Comments / Special Instructions, Relinquished/Received By, Date / Time, Custody Seal # 27016

5.2
5

14

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: FB(20190530)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-1	Date Received: 05/31/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/31/19 19:50	EB	SW846 7196A
Redox Potential Vs H2	501		mv	1	06/04/19 16:35	JOO	ASTM D1498-76
pH ^a	5.48 J		su	1	06/04/19 09:59	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-34(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-2	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.3 J	0.52	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	450		mv	1	06/04/19 19:09	EB	ASTM D1498-76M
Solids, Percent	76.4		%	1	06/03/19 16:30	MS	SM2540 G 18TH ED MOD
pH	6.32 J		su	1	06/04/19 18:38	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-3	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	10.6 J	0.54	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	437		mv	1	06/04/19 19:12	EB	ASTM D1498-76M
Solids, Percent	73.4		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.30 J		su	1	06/04/19 18:44	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-4	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	13.2 J	0.48	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	436		mv	1	06/04/19 19:17	EB	ASTM D1498-76M
Solids, Percent	82.7		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.19 J		su	1	06/04/19 18:45	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-35(2.0-2.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-5	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.0 J	0.49	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	419		mv	1	06/04/19 19:32	EB	ASTM D1498-76M
Solids, Percent	82.4		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.34 J		su	1	06/04/19 18:48	EB	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.4 J	0.49	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	415		mv	1	06/04/19 20:09	EB	ASTM D1498-76M
Solids, Percent	80.9		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	6.84 J		su	1	06/04/19 18:50	EB	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-35(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-7	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.9 J	0.51	mg/kg	1	06/04/19 15:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	410		mv	1	06/04/19 20:12	EB	ASTM D1498-76M
Solids, Percent	78.6		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.17 J		su	1	06/04/19 18:51	EB	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-35(8.0-8.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-8	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	62.2 J	1.1	mg/kg	2	06/04/19 16:44	RI	SW846 3060A/7196A
Redox Potential Vs H2	402		mv	1	06/04/19 20:14	EB	ASTM D1498-76M
Solids, Percent	70.9		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.39 J		su	1	06/04/19 18:53	EB	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-35(9.0-9.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-9	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	13.1 J	0.48	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	400		mv	1	06/04/19 20:16	EB	ASTM D1498-76M
Solids, Percent	82.8		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.55 J		su	1	06/04/19 18:54	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-27(2090531)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-10	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	18.8 J	0.49	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	401		mv	1	06/04/19 20:19	EB	ASTM D1498-76M
Solids, Percent	81.5		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.30 J		su	1	06/04/19 19:00	EB	SW846 9045D

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-36(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-11	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J	0.47	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	398		mv	1	06/04/19 20:23	EB	ASTM D1498-76M
Solids, Percent	84.8		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.49 J		su	1	06/04/19 19:01	EB	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-36(2.0-2.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-12		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J	0.47	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	402		mv	1	06/04/19 20:24	EB	ASTM D1498-76M
Solids, Percent	85.2		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.16 J		su	1	06/04/19 19:03	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-13	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.5 J	0.48	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	394		mv	1	06/04/19 20:26	EB	ASTM D1498-76M
Solids, Percent	83.1		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.57 J		su	1	06/04/19 19:09	EB	SW846 9045D

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: SW-36(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-14	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.9 J	0.49	mg/kg	1	06/04/19 15:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	456		mv	1	06/04/19 18:59	EB	ASTM D1498-76M
Solids, Percent	81.7		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.61 J		su	1	06/04/19 18:36	EB	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-36(8.0-8.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-15	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.65 J	0.64	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	403		mv	1	06/04/19 20:28	EB	ASTM D1498-76M
Solids, Percent	62.5		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	5.77 J		su	1	06/04/19 19:12	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-16	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 48.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.83 UJ	0.83	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	395		mv	1	06/04/19 20:29	EB	ASTM D1498-76M
Solids, Percent	48.1		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	5.57 J		su	1	06/04/19 19:17	EB	SW846 9045D

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: BS-G27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-17	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ	0.50	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	354		mv	1	06/04/19 20:32	EB	ASTM D1498-76M
Solids, Percent	80		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.55 J		su	1	06/04/19 19:31	EB	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: BS-F27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-18	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ	0.50	mg/kg	1	06/04/19 16:41	RI	SW846 3060A/7196A
Redox Potential Vs H2	370		mv	1	06/04/19 20:34	EB	ASTM D1498-76M
Solids, Percent	79.9		%	1	06/03/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.83 J		su	1	06/04/19 20:08	EB	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-34(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-2R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.87	0.52	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-3R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.8	0.54	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-4R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	19.1	0.48	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-35(2.0-2.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-5R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.1	0.49	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.0	0.49	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-35(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-7R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.6	0.51	mg/kg	1	06/07/19 17:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-35(8.0-8.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-8R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.56	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-35(9.0-9.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-9R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.2	0.48	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-27(2090531)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-10R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	11.0	0.49	mg/kg	1	06/07/19 18:29	NV	SW846-3060A/7196A

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-36(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-11R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.0	0.47	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-36(2.0-2.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-12R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.4	0.47	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-36(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-13R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	15.8	0.48	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-36(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-14R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2	0.49	mg/kg	1	06/07/19 17:39	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(6.0-6.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-14RT		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.44 J	0.20	%	1	06/14/19 13:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	06/14/19 13:00	MP	SM4500S2- A-11
Total Organic Carbon	7080	120	mg/kg	1	06/12/19 12:49	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(8.0-8.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-15R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81	0.64	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: BS-H27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-16R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 48.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.8	0.83	mg/kg	1	06/07/19 18:29	NV	SW846-3060A/7196A

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: BS-G27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-17R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/07/19 18:29	NV	SW846-3060A/7196A

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: BS-F27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-18R	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/07/19 18:29	NV	SW846 3060A/7196A

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-3ART	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	73.2 J	1.1	mg/kg	2	07/09/19 19:06	NV	SW846 3060A/7196A
Redox Potential Vs H2 ^a	294		mv	1	07/10/19 17:35	MS	ASTM D1498-76M
pH	8.31 J		su	1	07/10/19 17:35	MS	SW846 9045D

(a) Analysis done out of holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-4ART	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	0.80 J	0.48	mg/kg	1	07/09/19 19:06	NV	SW846 3060A/7196A
Redox Potential Vs H2 ^a	291		mv	1	07/10/19 17:36	MS	ASTM D1498-76M
pH	8.12 J		su	1	07/10/19 17:36	MS	SW846 9045D

(a) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6ART	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	1.4 J	0.49	mg/kg	1	07/09/19 19:06	NV	SW846 3060A/7196A
Redox Potential Vs H2 ^a	274		mv	1	07/10/19 17:39	MS	ASTM D1498-76M
pH	7.91 J		su	1	07/10/19 17:39	MS	SW846 9045D

(a) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190530)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-1A		Date Received: 05/31/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15442

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190530)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-1A	Date Received: 05/31/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/03/19 15:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-34(0.0-0.5) Lab Sample ID: JC89030-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 76.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	122	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	30.0	5.4	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	59.3	6.7	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-34(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-2A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 76.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	120	1.8	mg/kg	1	06/03/19 16:19	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0) Lab Sample ID: JC89030-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 73.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	804	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	92.9	5.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.6	2.6	mg/kg	2	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	136	6.6	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-3A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	793	1.8	mg/kg	1	06/03/19 16:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5) Lab Sample ID: JC89030-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 82.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	325	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	43.7	5.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	70.3	6.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-4A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	312	1.8	mg/kg	1	06/03/19 16:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-35(2.0-2.5) Lab Sample ID: JC89030-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 82.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	640	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	75.1	4.8	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	107	6.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-35(2.0-2.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-5A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 82.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	634	1.7	mg/kg	1	06/03/19 16:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(4.0-4.5) Lab Sample ID: JC89030-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 80.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	394	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	41.9	4.9	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	74.3	6.1	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	391	1.7	mg/kg	1	06/03/19 16:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(6.0-6.5) Lab Sample ID: JC89030-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 78.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	159	1.3	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	30.0	5.4	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	49.0	6.7	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-35(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-7A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 78.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	149	1.8	mg/kg	1	06/03/19 16:54	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-35(8.0-8.5) Lab Sample ID: JC89030-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 70.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	84.4	1.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	18.8	5.8	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	32.2	7.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-35(8.0-8.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-8A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 70.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.2	2.6	mg/kg	1	06/03/19 16:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-35(9.0-9.5) Lab Sample ID: JC89030-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 82.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	20.3 J	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.0 J	5.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3 J	6.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(9.0-9.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-9A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.2 J	1.8	mg/kg	1	06/03/19 17:05	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: DUP-27(2090531) Lab Sample ID: JC89030-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 81.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	106 J	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	28.0 J	4.8	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	43.8 J	6.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-27(2090531)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-10A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	87.2 J	1.7	mg/kg	1	06/03/19 20:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(0.0-0.5) Lab Sample ID: JC89030-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 84.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.6 UJ-	4.6	mg/kg	2	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	117	1.2	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	42.3	4.6	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	88.8	5.8	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-36(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-11A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 84.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	116	1.7	mg/kg	1	06/03/19 19:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(2.0-2.5) Lab Sample ID: JC89030-12A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 85.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	120	1.1	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	22.8	4.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	37.4	5.6	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-36(2.0-2.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-12A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 85.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	119	1.6	mg/kg	1	06/03/19 22:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(4.0-4.5) Lab Sample ID: JC89030-13A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 83.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	433	1.2	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	47.8	4.7	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	87.2	5.8	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-13A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 83.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	425	1.7	mg/kg	1	06/03/19 19:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(6.0-6.5) Lab Sample ID: JC89030-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 81.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	86.3	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	29.1	5.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	43.5	6.3	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-36(6.0-6.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-14A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 81.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	82.4	1.8	mg/kg	1	06/03/19 16:03	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(8.0-8.5) Lab Sample ID: JC89030-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 62.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.3 UJ-	3.3	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	863	1.6	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	121	6.5	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.3	3.3	mg/kg	2	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	246	8.1	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-36(8.0-8.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-15A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	862	2.2	mg/kg	1	06/03/19 20:00	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-36(8.0-8.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-15AR	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 62.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	< 0.39	0.39	mg/kg	5	06/11/19	06/11/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46895

(2) Prep QC Batch: MP15593

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-16A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 48.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 4.0 UJ-	4.0	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	178	2.0	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	175	8.1	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 2.0	2.0	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	100	10	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: BS-H27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-16A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 48.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	178	2.8	mg/kg	1	06/03/19 20:05	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: BS-G27		Date Sampled: 05/31/19
Lab Sample ID: JC89030-17A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	18.5	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	45.8	5.0	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	6.2	mg/kg	1	06/03/19	06/03/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: BS-G27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-17A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.5	1.7	mg/kg	1	06/03/19 20:10	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F27		Date Sampled: 05/31/19
Lab Sample ID: JC89030-18A		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ	2.4	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	22.1	1.2	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	30.5	4.9	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.5	6.1	mg/kg	1	06/03/19	06/03/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46839

(2) Prep QC Batch: MP15443

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: BS-F27	Date Sampled: 05/31/19
Lab Sample ID: JC89030-18A	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 79.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.7	mg/kg	1	06/03/19 20:15	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-34(1.5-2.0) Lab Sample ID: JC89030-3AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 73.4
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Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Chromium	1260		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 1.0		1.0	ug/l	2	07/10/19	07/11/19 SN	SW846 6020B ²	SW846 3010A ⁴
Vanadium	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³

- (1) Instrument QC Batch: MA47077
- (2) Instrument QC Batch: MA47084
- (3) Prep QC Batch: MP16335
- (4) Prep QC Batch: MP16335A

RL = Reporting Limit
 MCL = Maximum Contamination Level (not available)

4.1
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-3AR	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 73.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.15		su	1	07/09/19 12:40	JOO	SW846 1312
Volume, SPLP Leachate	2.013		l	1	07/09/19 12:40	JOO	SW846 1312
Weight, SPLP Leachate	0.1007		kg	1	07/09/19 12:40	JOO	SW846 1312
Dry Weight, SPLP Leachate	0.07388		kg	1	07/09/19 12:40	JOO	SW846 1312

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-34(1.5-2.0) Lab Sample ID: JC89030-3ARA Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 73.4
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	357	1.4	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	42.0	5.6	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	68.6	7.0	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47054

(2) Prep QC Batch: MP16232

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5) Lab Sample ID: JC89030-4AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 82.7
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Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Chromium	48.0		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 1.0		1.0	ug/l	2	07/10/19	07/11/19 SN	SW846 6020B ²	SW846 3010A ⁴
Vanadium	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³

- (1) Instrument QC Batch: MA47077
- (2) Instrument QC Batch: MA47084
- (3) Prep QC Batch: MP16335
- (4) Prep QC Batch: MP16335A

RL = Reporting Limit
 MCL = Maximum Contamination Level (not available)

4.3
4

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-4AR	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.24		su	1	07/09/19 12:40	JOO	SW846 1312
Volume, SPLP Leachate	2.008		l	1	07/09/19 12:40	JOO	SW846 1312
Weight, SPLP Leachate	0.1004		kg	1	07/09/19 12:40	JOO	SW846 1312
Dry Weight, SPLP Leachate	0.08301		kg	1	07/09/19 12:40	JOO	SW846 1312

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(0.0-0.5)		Date Sampled: 05/31/19
Lab Sample ID: JC89030-4ARA		Date Received: 05/31/19
Matrix: SO - Soil		Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	448	1.2	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	62.5	4.8	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	99.9	6.0	mg/kg	1	07/02/19	07/08/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47054

(2) Prep QC Batch: MP16232

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-35(4.0-4.5) Lab Sample ID: JC89030-6AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/31/19 Date Received: 05/31/19 Percent Solids: 80.9
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Metals Analysis, SPLP Leachate SW846 1312

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Chromium	22.5		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10		10	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 1.0		1.0	ug/l	2	07/10/19	07/11/19 SN	SW846 6020B ²	SW846 3010A ⁴
Vanadium	< 50		50	ug/l	1	07/10/19	07/11/19 ND	SW846 6010D ¹	SW846 3010A ³

- (1) Instrument QC Batch: MA47077
- (2) Instrument QC Batch: MA47084
- (3) Prep QC Batch: MP16335
- (4) Prep QC Batch: MP16335A

RL = Reporting Limit
 MCL = Maximum Contamination Level (not available)

4.5
4

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6AR	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.65		su	1	07/09/19 12:40	JOO	SW846 1312
Volume, SPLP Leachate	2.008		l	1	07/09/19 12:40	JOO	SW846 1312
Weight, SPLP Leachate	0.1004		kg	1	07/09/19 12:40	JOO	SW846 1312
Dry Weight, SPLP Leachate	0.08030		kg	1	07/09/19 12:40	JOO	SW846 1312

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-35(4.0-4.5)	Date Sampled: 05/31/19
Lab Sample ID: JC89030-6ARA	Date Received: 05/31/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/02/19	07/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	30.4	1.3	mg/kg	1	07/02/19	07/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	17.7	5.1	mg/kg	1	07/02/19	07/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/02/19	07/08/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.0	6.4	mg/kg	1	07/02/19	07/08/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47054

(2) Prep QC Batch: MP16232

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC87428, JC87654, JC87762, JC87843, JC87941, and JC88380

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34256R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC87428, JC87654, JC87762, JC87843, JC87941, and JC88380 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC87428	FB(20190502)	JC87428-1	Water	5/2/2019			X	
	BS-J12E	JC87428-2	Soil	5/2/2019			X	
JC87654	BS-I13D	JC87654-1	Soil	5/7/2019		X	X	X
	BS-I14D	JC87654-2	Soil	5/7/2019		X	X	X
	BS-J15	JC87654-4	Soil	5/7/2019		X	X	X
	FB(20190507)	JC87654-5	Water	5/7/2019		X	X	X
JC87762	FB(20190508)	JC87762-1	Water	5/8/2019		X	X	X
	ED006	JC87762-2	Soil	5/8/2019		X	X	X
JC87843	FB(20190509)	JC87843-1	Water	5/9/2019		X	X	X
	ED007	JC87843-2	Soil	5/9/2019		X	X	X
	107_E031	JC87843-3	Soil	5/9/2019		X	X	X
	BS-J16S	JC87843-4	Soil	5/9/2019		X	X	X
	BS-I17S	JC87843-5	Soil	5/9/2019		X	X	X
	DUP-26(20190509)	JC87843-6	Soil	5/9/2019	BS-I17S	X	X	X
JC87941	FB(20190510)	JC87941-1	Water	5/10/2019		X	X	X
	BS-J17	JC87941-2	Soil	5/10/2019		X	X	X
JC88380	FB(20190517)	JC88380-1	Water	5/17/2019		X	X	X
	BS-G30	JC88380-2	Soil	5/17/2019		X	X	X
	BS-G29	JC88380-3	Soil	5/17/2019		X	X	X
	BS-I18	JC88380-4	Soil	5/17/2019		X	X	X
	BS-J18	JC88380-5	Soil	5/17/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.

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3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC87654, JC87762, JC87843, JC87941, and JC88380: Miscellaneous parameters for samples BS-I13D, ED006, BS-J16S, BS-J17, and BS-G30 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

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ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

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INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

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All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC87428, JC87762, JC87941, and JC88380: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC87654 and JC87843: The MS/MSD analysis performed on sample locations BS-J15 and BS-J16S exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-J15	Antimony	62.8%	63.1%
BS-J16S	Antimony	67.2%	66.1%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

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Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC87428, JC87762, JC87941, and JC88380: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC87654 and JC87843: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-J15 and BS-J16S. The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-I17S – DUP-26(20190509)	Chromium	10	12.3	20.6%
	Nickel	10.6	12.0	AC
	Vanadium	15.1	18.9	
	Trivalent Chromium	7.9	11.6	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-I17S and field duplicate sample DUP-26(20190509) were acceptable.

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7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC87428, JC87762, JC87941, and JC88380: The serial dilution analysis was not performed using a sample from these SDGs.

SDGs #JC87654, and JC87843: The serial dilution performed on sample locations BS-J15 and BS-J16S exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC88380: The MS analysis performed on sample location BS-G30 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC87654, JC87762, JC87843, JC87941, and JC88380: The MS analysis performed on sample locations BS-I13D, ED006, BS-J16S, BS-J17, and BS-G30 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-I13D	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	59.2%	66.5%
ED006	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	64.9%	56.0%
BS-J16S	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		
BS-J17	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		
BS-G30	Hexavalent Chromium, Soluble	68.4%	51.4%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected (“R”); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC87654, JC87762, and JC88380: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

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SDG #JC87843 and JC87941: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use (“RA” qualifier).

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC87941 and JC88380: The PDS analysis performed on sample locations BS-J17, BS-G30 exhibited recoveries within the control limits.

SDGs #JC87654, JC87762, and JC87843: The PDS analysis performed on sample locations BS-I13D, ED006, and BS-J16S exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-I13D	Hexavalent Chromium	< 85%	< 85%
ED006	Hexavalent Chromium	< 85%	< 85%
BS-J16S	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs # JC87654, JC87762, JC87843, JC87941, and JC88380: The laboratory duplicate analysis performed on sample location BS-I13D, ED006, BS-J16S, BS-J17, and BS-G30 exhibited results within the control limit.

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5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-I17S / DUP-26(20190509)	Hexavalent Chromium	2.1	0.70	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample BS-I17S and field duplicate sample DUP-26(20190509) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-J17	SW846 9045D	Analysis: 3 days	< 24 hours of receipt by laboratory
BS-J17	ASTM D3872-86	Analysis: 19 days	< 24 hours from collection
BS-J16S		Analysis: 20 days	
ED006		Analysis: 21 days	
BS-I13D		Analysis: 22 days	
BS-G30		Analysis: 28 days	
BS-J17		SM4500S2-A	
BS-J16S	Analysis: 20 days		
ED006	Analysis: 21 days		
BS-I13D	Analysis: 22 days		
BS-G30	Analysis: 28 days		
BS-I13D	Lloyd Kahn	Analysis: 15 days	14 days from collection
BS-G30		Analysis: 26 days	

Sample results were qualified as specified in the table below. All other holding times were met.

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Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC87941: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC87654, JC87762, JC87843, and JC88380: The laboratory duplicate analysis performed on sample locations BS-I13D, ED006, BS-J16S, and BS-G30 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

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sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-117S / DUP-26(20190509)	Redox Potential	143	146	2.1%
	pH	6.84	6.78	0.9%

The differences in the results between the parent sample BS-117S and field duplicate sample DUP-26(20190509) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 2, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SD
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC87428

Client / Reporting Information		Project Information				Requested Analysis (see TEST CODE sheet)												Matrix Codes		
Company Name ARCADIS		Project Name PPG Jersey City Site 107																CW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address 10 Friends Lane		Street 18 Chapel Ave		Billing Information (if different from Report to)																
City State Zip Newtown PA 18940		City State Jersey City NJ		Company Name																
Project Contact Krista Mastrocola		Project # NP000770.0003		Street Address																
Phone # 610-755-7080		Client Purchase Order #		City State Zip																
Sampler(s) Name(s) J McLaughlin / B Quinans		Phone # 201 7423460		Project Manager Tim McLaughlin Jr		Attention:														
Lab Sample #	Field ID / Point of Collection	MEQ/IDI Vial #	Collection			Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY		
			Date	Time	Sampled by			HCl	NO ₃	NO ₂	H ₂ SO ₄	HNO ₃	DI Water	MEDIA	ENDURE					
1	FB(20190502)		5/2/19	1120	GR	FB	2		1	1							X	A5		
2	BS-J12E		5/2/19	1250	GR	SO	1			1							X	A43 D61		

Turnaround Time (Business days)	Data Deliverable Information	Comments / Special Instructions
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____	Approved by (SGS Project Manager)/Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input type="checkbox"/> EDD Format <input type="checkbox"/> Commercial "C" <input checked="" type="checkbox"/> Other EQUS <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting <small>Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data</small>	INITIAL ASSESSMENT 3A12P LABEL VERIFICATION _____

Emergency & Rush TIA data available via LabLink

Sample inventory is verified upon receipt in the Laboratory

Relinquished by Sampler: A. [Signature]	Date Time: 5-2-19 14:00	Received By: [Signature]	Relinquished by: [Signature]	Date Time: 5/2/19 17:35	Received By: [Signature]
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished by: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # 27534	<input type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>

On Ice Cooler Temp. **2.7°C**

5.1
5



Report of Analysis

Client Sample ID: FB (20190502)		Date Sampled: 05/02/19
Lab Sample ID: JC87428-1		Date Received: 05/02/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	< 10	10	ug/l	1	05/03/19	05/03/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46647

(2) Prep QC Batch: MP14768

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J12E		Date Sampled: 05/02/19
Lab Sample ID: JC87428-2		Date Received: 05/02/19
Matrix: SO - Soil		Percent Solids: 80.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Nickel	31.9	5.0	mg/kg	1	05/03/19	05/04/19 MET	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46646

(2) Prep QC Batch: MP14776

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

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2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **AK-011719-231**
SGS Job # **JC87654**

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes						
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EQ - Equipment Blank RB - Rinsed Blank TB - Trip Blank						
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																							
City, State, Zip: Newtown PA 18940		City, State, Zip: Jersey City, NJ																							
Project Contact: Krista Astorola		Billing Information (if different from Report to): Company Name: Project #: Street Address: City: State: Zip:																							
Phone #: 610-55-7080		Client Purchase Order #: MP07700003																							
Sampler(s) Name(s): C. Kelly		Project Manager: Jim McLaughlin										LAB USE ONLY													
SCS Sample #	Field ID / Point of Collection	MEQ/MLI Vol #	Date	Time	Sampled by	Qvol (L) (Cont. IC)	Matrix	# of bottles	MSD	INCO	INCO	INCO	INCO	INCO	INCO	INCO	INCO	INCO							
1	BS-I13D		5/7/19	1245	CC	G	SO	1																	
2	BS-I14D		5/7/19	1230	CC	G	SO	1																	
3	ED006		5/7/19	1300	CC	G	SO	1																	
4	BS-I15		5/7/19	1330	CC	G	SO	1																	
5	FB(20190507)		5/7/19	1130	CC	FB	FB	2																	
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions													
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQ015							INITIAL ASSESSMENT 3A (N) LABEL VERIFICATION						
Approved By (SGS PM) / Date:		Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions													
All data available via Lablink		Approval needed for 1-3 Business Day TAT										Sample Custody must be documented below each time samples change possession, including courier delivery.													
Relinquished by: Jim	Date / Time: 5/7/19 1245	Received By: Robert Chumbauer	Date / Time: 5/7/19 1545	Relinquished by: Robert Chumbauer	Date / Time: 5/7/19 1545	Received By: [Signature]	Date / Time: 5/7/19 1545	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:							
Custody Seal #		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact										<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Therm. ID:													
On Ice		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No										<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No													

5.2
5

EHS-QAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: BS-I13D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-1	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ-	0.52	mg/kg	1	05/09/19 16:58	NV	SW846 3060A/7196A
Redox Potential Vs H2	178		mv	1	05/08/19 19:38	EB	ASTM D1498-76M
Solids, Percent	77.6		%	1	05/08/19 14:14	BG	SM2540 G 18TH ED MOD
pH	6.73		su	1	05/08/19 20:45	EB	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I14D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-2	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	05/09/19 17:08	NV	SW846 3060A/7196A
Redox Potential Vs H2	199		mv	1	05/08/19 19:42	EB	ASTM D1498-76M
Solids, Percent	84.4		%	1	05/08/19 14:14	BG	SM2540 G 18TH ED MOD
pH	6.43		su	1	05/08/19 20:54	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 05/07/19
Lab Sample ID: JC87654-4	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	05/09/19 17:08	NV	SW846 3060A/7196A
Redox Potential Vs H2	183		mv	1	05/08/19 19:45	EB	ASTM D1498-76M
Solids, Percent	71.5		%	1	05/08/19 14:14	BG	SM2540 G 18TH ED MOD
pH	6.58		su	1	05/08/19 20:56	EB	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190507)	Date Sampled: 05/07/19
Lab Sample ID: JC87654-5	Date Received: 05/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/07/19 23:59	JO	SW846 7196A
Redox Potential Vs H2	364		mv	1	05/08/19 19:55	EB	ASTM D1498-76
pH ^a	5.30		su	1	05/07/19 16:29	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I13D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-1R	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.52	mg/kg	1	05/13/19 14:21	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I13D		Date Sampled: 05/07/19
Lab Sample ID: JC87654-1RT		Date Received: 05/07/19
Matrix: SO - Soil		Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.6 J	0.20	%	1	05/29/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	05/29/19 12:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	13900 J	130	mg/kg	1	05/22/19 12:06	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I14D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-2R	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	05/13/19 14:30	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 05/07/19
Lab Sample ID: JC87654-4R	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56	0.56	mg/kg	1	05/13/19 14:30	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I13D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-1A	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.1	1.3	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.5	5.3	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.4	6.6	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46680

(2) Prep QC Batch: MP14865

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I13D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-1A	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 77.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.1	1.8	mg/kg	1	05/08/19 18:03	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I14D Lab Sample ID: JC87654-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/07/19 Date Received: 05/07/19 Percent Solids: 84.4
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.9	1.2	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.0	4.8	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	6.0	mg/kg	1	05/08/19	05/08/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46680

(2) Prep QC Batch: MP14865

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I14D	Date Sampled: 05/07/19
Lab Sample ID: JC87654-2A	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 84.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.9	1.7	mg/kg	1	05/08/19 18:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J15	Date Sampled: 05/07/19
Lab Sample ID: JC87654-4A	Date Received: 05/07/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	05/08/19	05/08/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	14.0	1.4	mg/kg	1	05/08/19	05/08/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	18.3	5.7	mg/kg	1	05/08/19	05/08/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/08/19	05/08/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	19.9	7.1	mg/kg	1	05/08/19	05/08/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46680

(2) Prep QC Batch: MP14865

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J15		Date Sampled: 05/07/19
Lab Sample ID: JC87654-4A		Date Received: 05/07/19
Matrix: SO - Soil		Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.5	2.0	mg/kg	1	05/08/19 17:53	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190507)	Date Sampled: 05/07/19
Lab Sample ID: JC87654-5A	Date Received: 05/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/08/19	05/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/08/19	05/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/08/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/08/19	05/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/08/19	05/08/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46680

(2) Prep QC Batch: MP14866

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190507)	Date Sampled: 05/07/19
Lab Sample ID: JC87654-5A	Date Received: 05/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/08/19 18:33	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



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E

FED EX Tracking #
SGS Quote #
Bottle Order Control #
SGS Job # **JC87762**

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes										
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Manganese Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank										
Street Address: 10 Friends Lane Newtown PA 18940		Street Address: 18 Chapel Ave Jersey City, NJ																											
City, State, Zip: Newtown PA 18940		City, State, Zip: Jersey City, NJ																											
Project Contact: Krista Magro col 9		Project #: NP000770.0003																											
Phone #: 610-755-7080		Client Purchase Order #:																											
Sampler(s) Name(s): C. Cifelli, 201-264-8065		Project Manager: Tim McLaughlin																											
SGS Barcode #	Field ID / Point of Collection	MECHDI Val #	Date	Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	ICL	INCH	PHOS	AS-SD	NOISE	EN Water	MECH	ENCORE	LAB USE ONLY												
	FB (20190508)		5/8/19	1210	GA FB	FB	2										X	X											
	ED006		5/8/19	1245	CC G	SO	1										X	X											
Turn Around Time (Business Days)																													
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>All days available via LabLink</small>						Approved By (SGS PM) / Date: _____ * Approval needed for 1-3 Business Day TAT						Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP						<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT MCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS						Comments / Special Instructions INITIAL ASSESSMENT 30 PM LABEL VERIFICATION http://www.sgs.com/en/terms-and-conditions					
Sample Custody must be documented below each time samples change possession, including courier delivery.																													
Relinquished by: C. Cifelli		Date / Time: 5/8/19 1310		Received by: T. Schram		Date / Time: 5/8/19 110		Relinquished by: T. Schram		Date / Time: 5/8/19		Received by: [Signature]																	
Relinquished by: [Signature]		Date / Time: [Signature]		Received by: [Signature]		Date / Time: [Signature]		Relinquished by: [Signature]		Date / Time: [Signature]		Received by: [Signature]																	
Relinquished by: [Signature]		Date / Time: [Signature]		Received by: [Signature]		Date / Time: [Signature]		Relinquished by: [Signature]		Date / Time: [Signature]		Received by: [Signature]																	
				Custody Seal # #7684		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent		Therm. ID: [Signature]		On Ice <input checked="" type="checkbox"/>		Cooler Temp. °C [Signature]															

5.2
5

CFO
32



Report of Analysis

Client Sample ID: FB(20190508)		Date Sampled: 05/08/19
Lab Sample ID: JC87762-1		Date Received: 05/08/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/08/19 23:28	JO	SW846 7196A
Redox Potential Vs H2	562		mv	1	05/09/19 10:28	RI	ASTM D1498-76
pH ^a	5.31		su	1	05/08/19 19:40	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: ED006	Date Sampled: 05/08/19
Lab Sample ID: JC87762-2	Date Received: 05/08/19
Matrix: SO - Soil	Percent Solids: 72.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	05/09/19 16:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	227		mv	1	05/09/19 11:21	RI	ASTM D1498-76M
Solids, Percent	72.7		%	1	05/09/19 17:00	BG	SM2540 G 18TH ED MOD
pH	6.70		su	1	05/09/19 10:08	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: ED006	Date Sampled: 05/08/19
Lab Sample ID: JC87762-2R	Date Received: 05/08/19
Matrix: SO - Soil	Percent Solids: 72.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55	0.55	mg/kg	1	05/14/19 13:19	NV	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ED006		Date Sampled: 05/08/19
Lab Sample ID: JC87762-2RT		Date Received: 05/08/19
Matrix: SO - Soil		Percent Solids: 72.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	05/29/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	05/29/19 12:00	MP	SM4500S2-A-H R
Total Organic Carbon	16300	140	mg/kg	1	05/22/19 12:33	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190508)	Date Sampled: 05/08/19
Lab Sample ID: JC87762-1A	Date Received: 05/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46687

(2) Prep QC Batch: MP14900

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190508)	Date Sampled: 05/08/19
Lab Sample ID: JC87762-1A	Date Received: 05/08/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/09/19 15:34	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: ED006 Lab Sample ID: JC87762-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/08/19 Date Received: 05/08/19 Percent Solids: 72.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.2	1.4	mg/kg	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.8	5.7	mg/kg	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.6	7.1	mg/kg	1	05/09/19	05/09/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46687

(2) Prep QC Batch: MP14898

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: ED006	Date Sampled: 05/08/19
Lab Sample ID: JC87762-2A	Date Received: 05/08/19
Matrix: SO - Soil	Percent Solids: 72.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.2	2.0	mg/kg	1	05/09/19 16:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



100
50

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E/L

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	JC 87843

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes	
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		Total chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank BB - Bottle Blank TB - Trip Blank	
Street Address: 10 Friends Lane		Street: 18 Chapel Ave															
City: Newtown PA 18940		City: Jersey City, NJ															
Project Contact: Krista Mastrocola		Product #: NP000770.0003															
Phone #: 610-755-7080		Client Purchase Order #															
Sampler(s) Name(s): C. C. Felt		Project Manager: Jim McLaughlin															
Phone #: 201-264-8065		Attention:															
Collection																	
SGS Sample #	Field ID / Point of Collection	MEQ/MDI Val #	Date	Time	Sampled By	Q=ms (S) Come (C)	Matrix	# of bottles	HCl	MeOH	HNO3	H2SO4	None	D/Water	MEDIA	ENDURE	LAB USE ONLY
1	FB(20190509)		5-9-18	0637	CC	FB	FB	2									
2	ED 007		5-9-18	0930	CC	G	SO	1									
3	107-ED31		5-9-18	0945	CC	G	SO	1									
4	BS-J16S		5-9-18	1000	CC	G	SO	1									
5	BS-J16S MS		5-9-18	1000	CC	G	SO	1									
6	DUP-26(20190509)		5-9-18	-	CC	G	SO	1									

5.2
5

Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other	Approved by (SGS PM) / Date: _____	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS	<input type="checkbox"/> DOD-QSM5	INITIAL ASSESSMENT 2B 2018 LABEL VERIFICATION _____

Ratified By: Date / Time: 5/9/19 12:50	Received By: Date / Time: _____	Ratified By: Date / Time: _____	Received By: Date / Time: _____
Ratified By: _____ Date / Time: _____	Received By: _____ Date / Time: _____	Ratified By: _____ Date / Time: _____	Received By: _____ Date / Time: _____

EHS-QAC-0023-02-FORM-Dayton - Standard COC.mxd



Report of Analysis

Client Sample ID: FB(20190509) Lab Sample ID: JC87843-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/09/19 Date Received: 05/09/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/09/19 23:05	EB	SW846 7196A
Redox Potential Vs H2	453		mv	1	05/10/19 17:15	RI	ASTM D1498-76
pH ^a	6.11		su	1	05/09/19 17:38	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ED007	Date Sampled: 05/09/19
Lab Sample ID: JC87843-2	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 79.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84 RA	0.51	mg/kg	1	05/10/19 18:52	NV	SW846 3060A/7196A R
Redox Potential Vs H2	188		mv	1	05/10/19 17:28	RI	ASTM D1498-76M
Solids, Percent	79.1		%	1	05/10/19 17:00	MR	SM2540 G 18TH ED MOD
pH	6.50		su	1	05/10/19 17:17	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_E031	Date Sampled: 05/09/19
Lab Sample ID: JC87843-3	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 RA	0.56	mg/kg	1	05/10/19 18:52	NV	SW846 3060A/7196A R
Redox Potential Vs H2	173		mv	1	05/10/19 17:33	RI	ASTM D1498-76M
Solids, Percent	71.5		%	1	05/10/19 17:00	MR	SM2540 G 18TH ED MOD
pH	6.42		su	1	05/10/19 17:21	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J16S	Date Sampled: 05/09/19
Lab Sample ID: JC87843-4	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.69 RA	0.52	mg/kg	1	05/10/19 18:41	NV	SW846 3060A/7196A R
Redox Potential Vs H2	171		mv	1	05/10/19 17:25	RI	ASTM D1498-76M
Solids, Percent	77		%	1	05/10/19 17:00	MR	SM2540 G 18TH ED MOD
pH	6.73		su	1	05/10/19 17:15	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I17S		Date Sampled: 05/09/19
Lab Sample ID: JC87843-5		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 69.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1 RA	0.57	mg/kg	1	05/10/19 18:52	NV	SW846 3060A/7196A R
Redox Potential Vs H2	143		mv	1	05/10/19 17:37	RI	ASTM D1498-76M
Solids, Percent	69.8		%	1	05/10/19 17:00	MR	SM2540 G 18TH ED MOD
pH	6.84		su	1	05/10/19 17:23	RI	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-26(20190509)	Date Sampled: 05/09/19
Lab Sample ID: JC87843-6	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.70 RA	0.55	mg/kg	1	05/10/19 18:52	NV	SW846 3060A/7196A
Redox Potential Vs H2	146		mv	1	05/10/19 17:43	RI	ASTM D1498-76M
Solids, Percent	72.8		%	1	05/10/19 17:00	MR	SM2540 G 18TH ED MOD
pH	6.78		su	1	05/10/19 17:26	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: ED007		Date Sampled: 05/09/19
Lab Sample ID: JC87843-2R		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 79.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 RA	0.51	mg/kg	1	05/15/19 14:16	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107_E031	Date Sampled: 05/09/19
Lab Sample ID: JC87843-3R	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99 RA	0.56	mg/kg	1	05/15/19 14:16	NV	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J16S	Date Sampled: 05/09/19
Lab Sample ID: JC87843-4R	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6 RA	0.52	mg/kg	1	05/15/19 14:07	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J16S		Date Sampled: 05/09/19
Lab Sample ID: JC87843-4RT		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	05/29/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	05/29/19 12:00	MP	SM4500S2 - A H R
Total Organic Carbon	19300	130	mg/kg	1	05/22/19 16:14	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I17S		Date Sampled: 05/09/19
Lab Sample ID: JC87843-5R		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 69.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.73 RA	0.57	mg/kg	1	05/15/19 14:16	NV	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-26(20190509)	Date Sampled: 05/09/19
Lab Sample ID: JC87843-6R	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61 RA	0.55	mg/kg	1	05/15/19 14:16	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190509) Lab Sample ID: JC87843-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/09/19 Date Received: 05/09/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14926

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190509)	Date Sampled: 05/09/19
Lab Sample ID: JC87843-1A	Date Received: 05/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/10/19 16:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: ED007	Date Sampled: 05/09/19
Lab Sample ID: JC87843-2A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 79.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	05/10/19	05/10/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	9.6	1.3	mg/kg	1	05/10/19	05/10/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	5.6	5.1	mg/kg	1	05/10/19	05/10/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/10/19	05/10/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	15.3	6.3	mg/kg	1	05/10/19	05/10/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14924

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: ED007	Date Sampled: 05/09/19
Lab Sample ID: JC87843-2A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 79.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.8	1.8	mg/kg	1	05/10/19 14:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_E031 Lab Sample ID: JC87843-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/09/19 Date Received: 05/09/19 Percent Solids: 71.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8 UJ-	2.8	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	16.7	1.4	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	18.7	5.5	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	17.1	6.9	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14924

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_E031	Date Sampled: 05/09/19
Lab Sample ID: JC87843-3A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 71.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.4	2.0	mg/kg	1	05/10/19 14:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-J16S	Date Sampled: 05/09/19
Lab Sample ID: JC87843-4A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	12.7	1.3	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	11.3	5.4	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	6.7	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14924

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J16S		Date Sampled: 05/09/19
Lab Sample ID: JC87843-4A		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 77.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.0	1.8	mg/kg	1	05/10/19 14:30	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I17S	Date Sampled: 05/09/19
Lab Sample ID: JC87843-5A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 69.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10	1.4	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.6	5.8	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	15.1	7.2	mg/kg	1	05/10/19	05/10/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14924

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I17S	Date Sampled: 05/09/19
Lab Sample ID: JC87843-5A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 69.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.9	2.0	mg/kg	1	05/10/19 15:06	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-26(20190509)	Date Sampled: 05/09/19
Lab Sample ID: JC87843-6A	Date Received: 05/09/19
Matrix: SO - Soil	Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	12.3	1.3	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	12.0	5.4	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	18.9	6.7	mg/kg	1	05/10/19	05/10/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46695

(2) Prep QC Batch: MP14924

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-26(20190509)		Date Sampled: 05/09/19
Lab Sample ID: JC87843-6A		Date Received: 05/09/19
Matrix: SO - Soil		Percent Solids: 72.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.6	1.9	mg/kg	1	05/10/19 15:11	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Client / Reporting Information Company Name: Amradis Street Address: 10 Friends Lane City: Newtown PA 18940 Project Contact: Krista Mastropols Phone: 610-765-7080 Sample(s) Name(s): CCifelli 201-264-8065		Project Information Project Name: PPG Jersey City Site 107 Street: 18 Chapel Ave City: Jersey City, NJ Project #: NP000770.000.3 Project Manager: Jim McLaughlin		FED-EX Tracking # SGS Guide # Bottle Order Control # SGS Job # JC87941	
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other All data available via Lablink		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format ERQS Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data		Requested Analysis Total chromium Trivalent chromium Hexavalent chromium Arsenic Nickel Thallium Vanadium Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
LAB USE ONLY A13 G10 n26		Comments / Special Instructions INITIAL ASSESSMENT 3A DM LABEL VERIFICATION 1620 http://www.sgs.com/en/terms-and-conditions			
Signatures and Dates 1. Released by: [Signature] Date / Time: 5-10-19 13:25 2. Received By: [Signature] Date / Time: 5/10/19 1:35 3. Relinquished by: [Signature] Date / Time: 3 Received By: [Signature] Date / Time: 4 4. Relinquished by: [Signature] Date / Time: 5 Received By: [Signature] Date / Time: 5 5. Relinquished by: [Signature] Date / Time: 5 Received By: [Signature] Date / Time: 5					
Custody Seal # 34204 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input checked="" type="checkbox"/> Preserved when applicable <input type="checkbox"/> Absent Therm. ID: _____ On Ice: <input checked="" type="checkbox"/> Cooler Temp. °C: _____					

5.2
5

3.1

Report of Analysis

Client Sample ID: FB(20190510)		Date Sampled: 05/10/19
Lab Sample ID: JC87941-1		Date Received: 05/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/10/19 19:50	JOO	SW846 7196A
Redox Potential Vs H2	563		mv	1	05/13/19 09:55	RI	ASTM D1498-76
pH ^a	4.58		su	1	05/10/19 18:35	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J17	Date Sampled: 05/10/19
Lab Sample ID: JC87941-2	Date Received: 05/10/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 RA	0.53	mg/kg	1	05/13/19 17:37	NV	SW846 3060A/7196A
Redox Potential Vs H2	211		mv	1	05/13/19 15:44	RI	ASTM D1498-76M
Solids, Percent	75.6		%	1	05/13/19 15:15	BG	SM2540 G 18TH ED MOD
pH	6.60 J		su	1	05/13/19 15:27	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J17	Date Sampled: 05/10/19
Lab Sample ID: JC87941-2R	Date Received: 05/10/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 RA	0.53	mg/kg	1	05/16/19 14:52	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J17	Date Sampled: 05/10/19
Lab Sample ID: JC87941-2RT	Date Received: 05/10/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	05/29/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	05/29/19 12:00	MP	SM4500S2 - A H R
Total Organic Carbon ^c	16600	130	mg/kg	1	05/22/19 16:36	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190510) Lab Sample ID: JC87941-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/10/19 Date Received: 05/10/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46703

(2) Prep QC Batch: MP14972

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190510)	Date Sampled: 05/10/19
Lab Sample ID: JC87941-1A	Date Received: 05/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/13/19 13:50	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-J17	Date Sampled: 05/10/19
Lab Sample ID: JC87941-2A	Date Received: 05/10/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3050B ²
Chromium	10.9	1.3	mg/kg	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3050B ²
Nickel	9.1	5.2	mg/kg	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.4	6.5	mg/kg	1	05/13/19	05/13/19 RP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46703

(2) Prep QC Batch: MP14970

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-J17	Date Sampled: 05/10/19
Lab Sample ID: JC87941-2A	Date Received: 05/10/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.4	1.8	mg/kg	1	05/13/19 17:14	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08210
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes															
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		<table border="1"> <tr> <td>Total Chromium</td> <td>Trivalent Chromium</td> <td>Hexavalent Chromium</td> <td>Antimony</td> <td>Nickel</td> <td>Thallium</td> <td>Vanadium</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												Total Chromium	Trivalent Chromium	Hexavalent Chromium	Antimony	Nickel	Thallium	Vanadium									DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Trivalent Chromium	Hexavalent Chromium	Antimony	Nickel	Thallium	Vanadium																									
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																													
City: Newtown IA 52940		City: Jersey City, NJ																													
Project Contact: Krishna Mankarala		Project #: NS000770.3.0001A																													
Phone #: 610.757.7080		Client Purchase Order #:																													
Signatures (Name/Title): Charishna Cifelli		Project Manager: Jim McLaughlin, Jr.																													
SGS Sample #	Field ID / Point of Collection	MEOW/DI Viol #	Date	Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	HC	MSH	MSH-C	HSDN	MSDN	DI Water	MEDIA	ENCLOSURE	LAB USE ONLY														
1	FB(2017.05.17)		5/17/19	0645	CC	G	FB	2									A31														
2	BS - G30		5/17/19	1010	CC	G	SO	1									C49														
3	BS - G29		5/17/19	1020	CC	G	SO	1																							
4	BS - I18		5/17/19	1230	CC	G	SO	1									B17														
5	BS - J18		5/17/19	1250	CC	G	SO	1																							

5.2
5

Turn Around Time (Business Days): _____

Approved By (SGS PM): / Date: _____

Deliverable: Commercial "A" (Level 1) NYASP Category A DOD-QSMS

Commercial "B" (Level 2) NYASP Category B MA MCP Criteria

NJ Reduced (Level 3) Full Tier 1 (Level 4) CT RCP Criteria

Commercial "C" State Forms

NJ DKQP EDD Format

Commercial "A" = Results only; Commercial "B" = Results + QC Summary; Commercial "C" = Results + QC Summary + Partial Raw Data

Sample Custody must be documented below. Use time samples, change possession, including courier delivery. <http://www.sgs.com/en/terms-and-conditions>

Relinquished by: a. Jaffer	Date / Time: 5/17/19 1306	Received By: Jim McLaughlin, Jr.	Date / Time: 5/17/19 0851	Received By: [Signature]
Relinquished by:	Date / Time:	Received By:	Date / Time:	Received By:
Relinquished by:	Date / Time:	Received By:	Date / Time:	Received By:

Custody Seal # **13890** Intact Preserved where applicable Not intact Absent Therm: ID: **Jaffer**

INITIAL ASSESSMENT 3A
LABEL VERIFICATION _____



Report of Analysis

Client Sample ID: FB(20190517)	Date Sampled: 05/17/19
Lab Sample ID: JC88380-1	Date Received: 05/17/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/17/19 21:31	EB	SW846 7196A
Redox Potential Vs H2	452		mv	1	05/18/19 14:12	JOO	ASTM D1498-76
pH ^a	6.00		su	1	05/17/19 18:50	HM	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/17/19
Lab Sample ID: JC88380-2	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	05/21/19 15:22	RI	SW846 3060A/7196A
Redox Potential Vs H2	318		mv	1	05/18/19 14:04	JOO	ASTM D1498-76M
Solids, Percent	80.9		%	1	05/20/19 08:47	RC	SM2540 G 18TH ED MOD
pH	7.91		su	1	05/18/19 16:40	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G29	Date Sampled: 05/17/19
Lab Sample ID: JC88380-3	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	05/21/19 15:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	292		mv	1	05/18/19 14:08	JOO	ASTM D1498-76M
Solids, Percent	82.7		%	1	05/20/19 08:47	RC	SM2540 G 18TH ED MOD
pH	8.10		su	1	05/18/19 16:41	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I18		Date Sampled: 05/17/19
Lab Sample ID: JC88380-4		Date Received: 05/17/19
Matrix: SO - Soil		Percent Solids: 51.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.78 UJ-	0.78	mg/kg	1	05/21/19 15:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	150		mv	1	05/18/19 14:10	JOO	ASTM D1498-76M
Solids, Percent	51.1		%	1	05/20/19 08:47	RC	SM2540 G 18TH ED MOD
pH	6.78		su	1	05/18/19 16:43	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-5	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 60.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.66 UJ-	0.66	mg/kg	1	05/21/19 15:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	119		mv	1	05/18/19 14:11	JOO	ASTM D1498-76M
Solids, Percent	60.3		%	1	05/20/19 08:47	RC	SM2540 G 18TH ED MOD
pH	6.52		su	1	05/18/19 16:45	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/17/19
Lab Sample ID: JC88380-2R	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79	0.49	mg/kg	1	06/04/19 16:58	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/17/19
Lab Sample ID: JC88380-2RT	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.79 J	0.20	%	1	06/14/19 13:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/14/19 13:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	482 J	120	mg/kg	1	06/12/19 13:34	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G29	Date Sampled: 05/17/19
Lab Sample ID: JC88380-3R	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55	0.48	mg/kg	1	06/04/19 17:05	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-4R	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 51.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.78	0.78	mg/kg	1	06/04/19 17:05	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-J18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-5R	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 60.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98	0.66	mg/kg	1	06/04/19 17:05	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190517) Lab Sample ID: JC88380-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/17/19 Date Received: 05/17/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/18/19	05/21/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/18/19	05/21/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/18/19	05/21/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/18/19	05/21/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/18/19	05/21/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46755

(2) Prep QC Batch: MP15158

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190517)	Date Sampled: 05/17/19
Lab Sample ID: JC88380-1A	Date Received: 05/17/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/21/19 03:13	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G30 Lab Sample ID: JC88380-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/17/19 Date Received: 05/17/19 Percent Solids: 80.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	25.8	1.2	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	52.4	4.9	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	22.5	6.1	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46753

(2) Prep QC Batch: MP15144

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/17/19
Lab Sample ID: JC88380-2A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 80.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.8	1.7	mg/kg	1	05/20/19 21:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G29	Date Sampled: 05/17/19
Lab Sample ID: JC88380-3A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	24.1	1.2	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	53.8	4.8	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	22.7	6.0	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46753

(2) Prep QC Batch: MP15144

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G29	Date Sampled: 05/17/19
Lab Sample ID: JC88380-3A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1	1.7	mg/kg	1	05/20/19 21:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I18 Lab Sample ID: JC88380-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/17/19 Date Received: 05/17/19 Percent Solids: 51.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 4.0	4.0	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	32.8	2.0	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	47.9	8.1	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium ^a	< 4.0	4.0	mg/kg	2	05/19/19	05/21/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	42.0	10	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46753

(2) Prep QC Batch: MP15144

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-4A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 51.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.8	2.8	mg/kg	1	05/20/19 21:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-4AR	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 51.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	0.41	0.25	mg/kg	5	05/24/19	05/28/19 GT	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46806

(2) Prep QC Batch: MP15253

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-J18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-5A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 60.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2	3.2	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	23.2	1.6	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	22.6	6.4	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	34.4	8.1	mg/kg	1	05/19/19	05/20/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46753

(2) Prep QC Batch: MP15144

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-J18	Date Sampled: 05/17/19
Lab Sample ID: JC88380-5A	Date Received: 05/17/19
Matrix: SO - Soil	Percent Solids: 60.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.2	2.3	mg/kg	1	05/20/19 21:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC88502, JC88569, JC88724, JC88825, and JC88881

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34257R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC88502, JC88569, JC88724, JC88825, and JC88881 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC88502	FB(20190521)	JC88502-1	Water	5/21/2019		X	X	X
	BS-H30	JC88502-2	Soil	5/21/2019		X	X	X
	BS-G30	JC88502-3	Soil	5/21/2019		X	X	X
JC88569	FB(20190522)	JC88569-1	Water	5/22/2019		X	X	X
	BS-I18D	JC88569-2	Soil	5/22/2019		X	X	X
	BS-F30D	JC88569-3	Soil	5/22/2019		X	X	X
JC88724	FB(20190524)	JC88724-1	Water	5/24/2019		X	X	X
	BS-I19	JC88724-2	Soil	5/24/2019		X	X	X
	BS-H30	JC88724-3	Soil	5/24/2019		X	X	X
JC88825	FB(20190528)	JC88825-1	Water	5/28/2019		X	X	X
	CS-G29	JC88825-2	Soil	5/28/2019		X	X	X
JC88881	FB(20190529)	JC88881-1	Water	5/29/2019		X	X	X
	BS-F29D	JC88881-2	Soil	5/29/2019		X	X	X
	BS-G29	JC88881-3	Soil	5/29/2019		X	X	X
	BS-H29	JC88881-4	Soil	5/29/2019		X	X	X
	BS-F28	JC88881-5	Soil	5/29/2019		X	X	X
	BS-H28	JC88881-6	Soil	5/29/2019		X	X	X
	BS-G28	JC88881-7	Soil	5/29/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC88502, JC88724, and JC88825: Miscellaneous parameters for samples BS-G30, BS-I19, and CS-G29 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

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All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC88502, JC88569, JC88825, and JC88881: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC88724: The MS/MSD analysis performed on sample location BS-119 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-119	Antimony	50.2%	51.7%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

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Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC88502, JC88569, JC88825, and JC88881: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC88724: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-I19. The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC88502, JC88569, JC88825, and JC88881: The serial dilution analysis was not performed using a sample from these SDGs.

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SDG #JC88724: The serial dilution performed on sample location BS-I19 exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC88569 and JC88881: The MS analysis performed on sample locations BS-F30D and BS-F29D in association with the soluble and insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC88825: The MS analysis performed on sample location CS-G29 in association with the soluble and insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC88502, JC88724, and JC88825: The MS analysis performed on sample locations BS-G30, BS-I19, and CS-G29 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-G30	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	68.6%	74.6%
BS-I19	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		
CS-G29	Hexavalent Chromium, Soluble	73.1%	72.0%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected (“R”); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC88502 and JC88825: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC88724: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use (“RA” qualifier).

DATA REVIEW REPORT

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC88569, JC88825, and JC88881: The PDS analysis performed on sample locations BS-F30D, CS-G29, and BS-F29D exhibited recoveries within the control limits.

SDGs #JC88502 and JC88724: The PDS analysis performed on sample locations BS-G30 and BS-I19 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-G30	Hexavalent Chromium	< 85%	< 85%
BS-I19	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs # JC88502, JC88569, JC88724, JC88825, and JC88881: The laboratory duplicate analysis performed on sample location BS-G30, BS-F30D, BS-I19, CS-G29, and BS-F29D exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-F29D BS-G29 BS-H29 BS-F28 BS-H28 BS-G28	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-I19 BS-H30		Analysis: 4 days	
CS-G29 BS-I19 BS-G30	ASTM D3872-86	Analysis: 17 days	< 24 hours from collection
		Analysis: 21 days	
		Analysis: 24 days	
CS-G29 BS-I19 BS-G30	SM4500S2-A	Analysis: 17 days	7 days from collection
		Analysis: 21 days	
		Analysis: 24 days	
CS-G29 BS-I19	Lloyd Kahn	Analysis: 15 days	14 days from collection
		Analysis: 19 days	

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
BS-G30		Analysis: 22 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC88724: The laboratory duplicate analysis was not performed using a sample from this SDG.

DATA REVIEW REPORT

SDGs #JC88502, JC88569, JC88825, and JC88881: The laboratory duplicate analysis performed on sample locations BS-H30, BS-I18D, CS-G29, and BS-F29D exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 4, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3498/3480
www.sgs.com/ehausa

E

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes																									
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Tantalum Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																									
Street Address: 10 Friends Lane		Street: 18 Chapel Avenue																																					
City: Newton IA 18940		City: Jersey City NJ																																					
Project Contact: Kyle Mastroluca		Project #: NY000770.3.1A		Billing Information (if different from Report to)		Company Name		Street Address		City		State		Zip																									
Phone #: 610.755.7080		Client Purchase Order #		Collection		Number of preserved Bottles		MEQ/DOI Vol #		Date		Time		Sampled by		Glab (G) Comp (C)		Matrix		# of bottles		HCl		HNO3		H2SO4		HF		H3PO4		HClO4		DI Water		MEQ		ENCLOSURE	
Samples (Name(s)): Christa Cifelli 201848005		Project Manager: Jim McLaughlin		Attention:		LAB USE ONLY		AS1		G51		D3																											
Turn Around Time (Business Days)		Approved By (SGS PM) / Date:		Deliverable		Comments / Special Instructions																																	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUL		INITIAL ASSESSMENT 260 LABEL VERIFICATION http://www.sgs.com/en/terms-and-conditions		Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data																															
Relinquished by: [Signature]		Date / Time: 5/21/19		Received By: [Signature]		Date / Time: 5/21/19 12:40		Relinquished by: [Signature]		Date / Time: 5/21/19 1:00		Received By: [Signature]		Date / Time: 5/21/19 1:00		Custody Seal # 11326		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input type="checkbox"/> Absent		<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Therm ID:		Cooler Temp. °C																	

5.2
5

CIP 304



Report of Analysis

Client Sample ID: FB(20190521) Lab Sample ID: JC88502-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/21/19 Date Received: 05/21/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/21/19 00:02	EB	SW846 7196A
Redox Potential Vs H2	455		mv	1	05/22/19 12:19	JOO	ASTM D1498-76
pH ^a	5.54		su	1	05/21/19 17:48	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-2	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 72.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	9.8 J-	0.55	mg/kg	1	05/22/19 17:06	RI	SW846 3060A/7196A
Redox Potential Vs H2	259		mv	1	05/22/19 13:19	JOO	ASTM D1498-76M
Solids, Percent	72.6		%	1	05/22/19 08:45	RC	SM2540 G 18TH ED MOD
pH	8.59		su	1	05/22/19 13:19	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-3	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	05/22/19 17:03	RI	SW846 3060A/7196A
Redox Potential Vs H2	264		mv	1	05/22/19 13:21	JOO	ASTM D1498-76M
Solids, Percent	80.6		%	1	05/22/19 08:45	RC	SM2540 G 18TH ED MOD
pH	8.61		su	1	05/22/19 13:21	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-2R	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 72.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	15.5	0.55	mg/kg	1	06/06/19 17:32	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-3R	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	06/06/19 17:27	NV	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-3RT	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.63 J	0.20	%	1	06/14/19 13:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/14/19 13:00	MP	SM4500S2 - A 11 R
Total Organic Carbon ^c	49300 J	120	mg/kg	1	06/12/19 11:52	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190521) Lab Sample ID: JC88502-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/21/19 Date Received: 05/21/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46773

(2) Prep QC Batch: MP15230

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190521)	Date Sampled: 05/21/19
Lab Sample ID: JC88502-1A	Date Received: 05/21/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/22/19 16:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-2A	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 72.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	688	1.4	mg/kg	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	46.0	5.5	mg/kg	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	51.7	6.8	mg/kg	1	05/22/19	05/22/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46773

(2) Prep QC Batch: MP15231

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-2A	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 72.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	678	2.0	mg/kg	1	05/22/19 16:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-3A	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/22/19	05/22/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.6	1.2	mg/kg	1	05/22/19	05/22/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.8	4.8	mg/kg	1	05/22/19	05/22/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/22/19	05/22/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	38.0	6.0	mg/kg	1	05/22/19	05/22/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46773

(2) Prep QC Batch: MP15231

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G30	Date Sampled: 05/21/19
Lab Sample ID: JC88502-3A	Date Received: 05/21/19
Matrix: SO - Soil	Percent Solids: 80.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.6	1.7	mg/kg	1	05/22/19 16:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control # **AK-042219-184**
SGS Quote #
SGS Job # **JC88569**

Client / Reporting Information Project Information Requested Analysis (see TEST CODE sheet) Matrix Codes

Company Name Arcadis		Project Name PPG Jersey City Site 107	
Street Address 10 Friends Lane		Street 18 Chapel Avenue	
City Newtown PA 18940		City Jersey City NJ	
Project Contact Krista Mastroluca		Billing Information (if different from Report to) Company Name	
Phone # 610.755.7080		Street Address	
E-mail christa.mastroluca@arcadis.com		City	
Project # NP000770.0003.1A000		State	
Client Purchase Order #		Zip	
Project Manager Jim McLaughlin		Attention:	

Requested Analysis	Matrix Codes
Total Chromium	DW - Drinking Water
Trivalent Chromium	GW - Ground Water
Hexavalent Chromium	WW - Water
Arsenic	SW - Surface Water
Nickel	SO - Soil
Thallium	SL - Sludge
Vanadium	SED - Sediment
	OI - Oil
	LIQ - Other Liquid
	AIR - Air
	SOL - Other Solid
	WP - Wipe
	FB - Field Blank
	EB - Equipment Blank
	RB - Rinse Blank
	TB - Trip Blank

Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles										LAB USE ONLY					
								HCl	HNO3	H2SO4	NONE	DI Water	MEDI	ENCORE	1	2	3		4	5	6	7	8
1	FB(20190522)		5/22/19	0830	CC	FB	4																A33
2	BS-118D		5/22/19	0900	CC	SO	1																G3
3	BS-F30D		5/22/19	1030	CC	SO	1																D4

Turnaround Time (Business days)	Approved by (SGS Project Manager)/Date:	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other	INITIAL ASSESSMENT 3B @ LABEL VERIFICATION _____
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Emergency & Rush T/A data available via LabLink

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished By: [Signature]	Date/Time: 5/22/19 1906	Received By: [Signature]	Date/Time: 5/22/19 1748
Relinquished By: [Signature]	Date/Time:	Received By: [Signature]	Date/Time:
Relinquished By: [Signature]	Date/Time:	Received By: [Signature]	Date/Time:
Relinquished By: [Signature]	Date/Time:	Received By: [Signature]	Date/Time:

Intact Preserved where applicable
 Not intact

On Ice Cooler Temp. **3.4°C**

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.



5.2
5

Report of Analysis

Client Sample ID: FB(20190522)		Date Sampled: 05/22/19
Lab Sample ID: JC88569-1		Date Received: 05/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/22/19 23:22	EB	SW846 7196A
Redox Potential Vs H2	315		mv	1	05/23/19 21:10	EB	ASTM D1498-76
pH ^a	5.80		su	1	05/22/19 17:40	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I18D		Date Sampled: 05/22/19
Lab Sample ID: JC88569-2		Date Received: 05/22/19
Matrix: SO - Soil		Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76	0.53	mg/kg	1	05/24/19 11:47	RI	SW846 3060A/7196A
Redox Potential Vs H2	177		mv	1	05/23/19 21:05	EB	ASTM D1498-76M
Solids, Percent	75.6		%	1	05/23/19 18:00	DTM	SM2540 G 18TH ED MOD
pH	7.06		su	1	05/23/19 21:40	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F30D		Date Sampled: 05/22/19
Lab Sample ID: JC88569-3		Date Received: 05/22/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	05/24/19 11:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	288		mv	1	05/23/19 21:07	EB	ASTM D1498-76M
Solids, Percent	87.1		%	1	05/23/19 18:00	DTM	SM2540 G 18TH ED MOD
pH	8.45		su	1	05/23/19 21:42	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190522)		Date Sampled: 05/22/19
Lab Sample ID: JC88569-1A		Date Received: 05/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46781

(2) Prep QC Batch: MP15251

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190522)		Date Sampled: 05/22/19
Lab Sample ID: JC88569-1A		Date Received: 05/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/23/19 14:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I18D		Date Sampled: 05/22/19
Lab Sample ID: JC88569-2A		Date Received: 05/22/19
Matrix: SO - Soil		Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.8	1.4	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.0	5.5	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.0	6.8	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46781

(2) Prep QC Batch: MP15249

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I18D	Date Sampled: 05/22/19
Lab Sample ID: JC88569-2A	Date Received: 05/22/19
Matrix: SO - Soil	Percent Solids: 75.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.0	1.9	mg/kg	1	05/23/19 14:54	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F30D		Date Sampled: 05/22/19
Lab Sample ID: JC88569-3A		Date Received: 05/22/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	24.1	1.1	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	43.2	4.4	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.4	5.5	mg/kg	1	05/23/19	05/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46781

(2) Prep QC Batch: MP15249

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F30D		Date Sampled: 05/22/19
Lab Sample ID: JC88569-3A		Date Received: 05/22/19
Matrix: SO - Soil		Percent Solids: 87.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1	1.6	mg/kg	1	05/23/19 14:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



50 FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E

FED-EX Tracking #
SGS Quote #
Bottle Order Control # **AK-042219-185**
SGS Job # **JC88724**

Client / Reporting Information		Project Information		Requested Analysis										Matrix Code								
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		<div style="display: flex; justify-content: space-around;"> Total Chromium Tri-valent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium </div>										DW - Drinking Wa GW - Ground Wa WW - Water SW - Surface Wa SO - Soil SL - Sludge SED - Sediment OC - Oil LIQ - Other Liqui AIR - Air SOL - Other Soli WP - Wipe FB - Field Blank EB - Equipment Bla RB - Rinse Blank TB - Trip Blank								
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.																				
City: Newtown PA 18840		City: Jersey City NJ																				
Project Contact: Krista Mashtroala		Project # NP000770.0003.1A000																				
Phone # 610.755.7080		Client Purchase Order #																				
Samples (Name(s)) Chr. sta. C-Fill; 201.241906		Project Manager Jim Alderton Jr																				
Sample #	Field ID / Point of Collection	MEQHV Vol #	Date	Time	Sampled By	One (1) Copy (C)	Matrix	# of bottles	PC	MOH	INCO	ALSO	HOME	DI Water	MEQH	ENCORE	LAB USE ONLY					
1	FB(20190524)		5/24/19	0800	CC	A	FB	4									X					
2	BS-719		5/24/19	0900	CC	G	SO	1									X					
3	BS-H30		5/29/19	1030	CC	C	SO	1									X					
<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;"> Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other </td> <td style="width: 30%;"> Approved By (SGS PE) / Date: </td> <td style="width: 30%;"> Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP </td> <td style="width: 10%;"> <input type="checkbox"/> NYAB Category A <input type="checkbox"/> NYAB Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format </td> <td style="width: 10%;"> <input type="checkbox"/> DOD-5385 </td> <td style="width: 30%;"> Comments / Special Instructions: INITIAL ASSESSMENT AB DN ABEL VERIFICATION _____ </td> </tr> </table>																	Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other	Approved By (SGS PE) / Date: 	Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP	<input type="checkbox"/> NYAB Category A <input type="checkbox"/> NYAB Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format	<input type="checkbox"/> DOD-5385	Comments / Special Instructions: INITIAL ASSESSMENT AB DN ABEL VERIFICATION _____
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other	Approved By (SGS PE) / Date: 	Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP	<input type="checkbox"/> NYAB Category A <input type="checkbox"/> NYAB Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format	<input type="checkbox"/> DOD-5385	Comments / Special Instructions: INITIAL ASSESSMENT AB DN ABEL VERIFICATION _____																	
<table border="0" style="width: 100%;"> <tr> <td style="width: 25%;"> Dispatched By: [Signature] Date / Time: 5/24/19 1510 </td> <td style="width: 25%;"> Received By: [Signature] Date / Time: 5/24/19 1510 </td> <td style="width: 25%;"> Dispatched By: [Signature] Date / Time: 5/24/19 1510 </td> <td style="width: 25%;"> Received By: [Signature] Date / Time: 5/24/19 1510 </td> </tr> </table>																	Dispatched By: [Signature] Date / Time: 5/24/19 1510	Received By: [Signature] Date / Time: 5/24/19 1510	Dispatched By: [Signature] Date / Time: 5/24/19 1510	Received By: [Signature] Date / Time: 5/24/19 1510		
Dispatched By: [Signature] Date / Time: 5/24/19 1510	Received By: [Signature] Date / Time: 5/24/19 1510	Dispatched By: [Signature] Date / Time: 5/24/19 1510	Received By: [Signature] Date / Time: 5/24/19 1510																			
Custody Seal # 11326 <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact																						

5.2 5

JC88724: Chain of Custody

Page 1 of 4



Report of Analysis

Client Sample ID: FB(20190524)	Date Sampled: 05/24/19
Lab Sample ID: JC88724-1	Date Received: 05/24/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/24/19 22:23	EB	SW846 7196A
Redox Potential Vs H2	468		mv	1	05/29/19 11:35	RI	ASTM D1498-76
pH ^a	5.55		su	1	05/24/19 15:45	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I19	Date Sampled: 05/24/19
Lab Sample ID: JC88724-2	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64 RA	0.64	mg/kg	1	05/28/19 15:43	RI	SW846 3060A/7196A
Redox Potential Vs H2	226		mv	1	05/28/19 23:11	EB	ASTM D1498-76M
Solids, Percent	62.6		%	1	05/28/19 08:13	RC	SM2540 G 18TH ED MOD
pH	5.95 J		su	1	05/28/19 22:42	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/24/19
Lab Sample ID: JC88724-3	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.1 RA	0.54	mg/kg	1	05/28/19 15:48	RI	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	05/28/19 23:19	EB	ASTM D1498-76M
Solids, Percent	73.7		%	1	05/28/19 08:13	RC	SM2540 G 18TH ED MOD
pH	6.90 J		su	1	05/28/19 22:49	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I19	Date Sampled: 05/24/19
Lab Sample ID: JC88724-2R	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 RA	0.64	mg/kg	1	05/31/19 15:40	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I19		Date Sampled: 05/24/19
Lab Sample ID: JC88724-2RT		Date Received: 05/24/19
Matrix: SO - Soil		Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.9 J	0.20	%	1	06/14/19 13:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/14/19 13:00	MP	SM4500S2 - A 11 R
Total Organic Carbon ^c	52400 J	160	mg/kg	1	06/12/19 10:18	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/24/19
Lab Sample ID: JC88724-3R	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85 RA	0.54	mg/kg	1	05/31/19 15:49	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190524) Lab Sample ID: JC88724-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/24/19 Date Received: 05/24/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46805

(2) Prep QC Batch: MP15332

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190524)	Date Sampled: 05/24/19
Lab Sample ID: JC88724-1A	Date Received: 05/24/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/28/19 15:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I19	Date Sampled: 05/24/19
Lab Sample ID: JC88724-2A	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1 UJ-	3.1	mg/kg	1	05/28/19	05/28/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.7	1.5	mg/kg	1	05/28/19	05/28/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	22.2	6.1	mg/kg	1	05/28/19	05/28/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.1	3.1	mg/kg	2	05/28/19	05/28/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	35.4	3.0	mg/kg	1	05/28/19	05/28/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46805

(2) Prep QC Batch: MP15335

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I19		Date Sampled: 05/24/19
Lab Sample ID: JC88724-2A		Date Received: 05/24/19
Matrix: SO - Soil		Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.2	2.1	mg/kg	1	05/28/19 14:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I19	Date Sampled: 05/24/19
Lab Sample ID: JC88724-2AR	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 62.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	0.27	0.25	mg/kg	5	05/31/19	06/03/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46841

(2) Prep QC Batch: MP15253

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/24/19
Lab Sample ID: JC88724-3A	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	338	1.3	mg/kg	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	97.7	5.3	mg/kg	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.5	6.7	mg/kg	1	05/28/19	05/28/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46805

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H30	Date Sampled: 05/24/19
Lab Sample ID: JC88724-3A	Date Received: 05/24/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	333	1.8	mg/kg	1	05/28/19 14:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-4200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes	
Company Name: Arcadis		Project Name: PPG SITE 107 - JERSEY CITY														DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LID - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
Street Address: 10 Friends Lane Suite 100		Street: 18 Chapel Ave															
City: Newtown PA 18940		City: Jersey City NJ															
Project Contact: Krista Mastacola		Project #:															
Phone: 610-755-7080		Client Purchase Order #:															
Sampler(s) Name(s): Christina Cifelli		Project Manager: Jim McLaughlin															
SGS Sample #	Field ID / Point of Collection	MEQ(HI) Via #	Date	Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	LD	HM/D	HM/SO	HM/NO	HM/NI	HM/ME	HM/EN	LAB USE ONLY	
1	FB (20190528)		5/28/19	1145	CC	G	FB	4								A4	
2	CS-G29		5/28	1400	DM	G	S	1								M4	
3	CS-E22		5/28	1200	SM	G	S	1								C4	
4	CS-C21		5/28	1345	SM	G	S	1									
Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions													
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other _____ <small>All data available via Lablink</small>		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format		INITIAL ASSESSMENT <u>3A</u> <u>(M)</u> LABEL VERIFICATION _____ <small>http://www.sgs.com/en/terms-and-conditions</small>											
Summary of custody must be documented below each time samples change possession including courier delivery.																	
1	Relinquished by: Jim McLaughlin	Date / Time: 5/28/19 1145	Received by: JENAN S/28/19 1445	Relinquished by: JENAN S/28/19	Date / Time: 1626	Received by: _____											
3	Relinquished by: _____	Date / Time: _____	Received by: _____	Relinquished by: _____	Date / Time: _____	Received by: _____											
5	Relinquished by: _____	Date / Time: _____	Received by: _____	Relinquished by: _____	Date / Time: _____	Received by: _____											
Custody Seal #		Intact <input type="checkbox"/> Not Intact <input type="checkbox"/>		Preserved where applicable		On Ice <input type="checkbox"/> Cooler Temp. °C											

5.2
5

3.2 cip



Report of Analysis

Client Sample ID: FB(20190528)		Date Sampled: 05/28/19
Lab Sample ID: JC88825-1		Date Received: 05/28/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/28/19 23:07	EB	SW846 7196A
Redox Potential Vs H2	496		mv	1	05/30/19 18:35	EB	ASTM D1498-76
pH ^a	6.05		su	1	05/28/19 16:44	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-G29	Date Sampled: 05/28/19
Lab Sample ID: JC88825-2	Date Received: 05/28/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ-	0.43	mg/kg	1	05/29/19 16:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	667		mv	1	05/29/19 22:58	EB	ASTM D1498-76M
Solids, Percent	93		%	1	05/29/19 08:34	RC	SM2540 G 18TH ED MOD
pH	6.23		su	1	05/29/19 23:14	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-G29	Date Sampled: 05/28/19
Lab Sample ID: JC88825-2R	Date Received: 05/28/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49	0.43	mg/kg	1	06/04/19 14:30	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-G29	Date Sampled: 05/28/19
Lab Sample ID: JC88825-2RT	Date Received: 05/28/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	< 0.20	0.20	%	1	06/14/19 13:00	MP	ASTM D3872-86 R
Sulfide Screen ^b	NEGATIVE			1	06/14/19 13:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	914 J	110	mg/kg	1	06/12/19 10:54	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190528) Lab Sample ID: JC88825-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/28/19 Date Received: 05/28/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46813

(2) Prep QC Batch: MP15374

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190528)	Date Sampled: 05/28/19
Lab Sample ID: JC88825-1A	Date Received: 05/28/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/29/19 18:28	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-G29	Date Sampled: 05/28/19
Lab Sample ID: JC88825-2A	Date Received: 05/28/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	1.4	1.1	mg/kg	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	111	4.4	mg/kg	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	< 5.5	5.5	mg/kg	1	05/29/19	05/29/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46813

(2) Prep QC Batch: MP15370

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-G29	Date Sampled: 05/28/19
Lab Sample ID: JC88825-2A	Date Received: 05/28/19
Matrix: SO - Soil	Percent Solids: 93.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 1.5	1.5	mg/kg	1	05/29/19 19:05	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499
www.sgs.com/ehsusua

4/6

Client Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)										Matrix Codes									
Company Name Arccadis		Project Name PPR Jersey City Site 107		Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank									
Street Address 10 Friends Lane Suite 10		Street 18 Chapel Ave.																					
City State Zip Newtown PA 18940		City State Jersey City NJ																					
Billing Information (if different from Report to) Company Name		Billing Information (if different from Report to) Company Name																					
Project Contact Krista Mastarola		Project # NP000770.0003.1A00																					
Phone # 610.755.7080		Client Purchase Order #																					
Sample(s) Name(s) Chasha C.G.11; 201.264.8065		Project Manager Jim McLaughlin, Jr.																					
Lab Sample #		MEOH/DI Vial #		Collection		# of bottles		Number of preserved bottles										LAB USE ONLY					
Field ID / Point of Collection		Date		Time		Sampled by		Matrix		HCl		HNO3		H2SO4		HNO2		DI Water		ENCORE			
1 FB(20190529)		5/29/19		0630		CC FB		4		2		2										A12	
2 BS-F29D		5/25/19		1020		CC SO		1														M24	
3 BS-G29		5/25/19		1015		CC SO		1														C4	
4 BS-H29		5/25/19		1000		CC SO		1															
5 BS-F28		5/29/19		1245		CC SO		1															
6 BS-H28		5/29/19		1300		CC SO		1															
7 BS-G28		5/29/19		1315		CC SO		1															
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date:		Data Deliverable Information										Comments / Special Instructions									
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Date of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Other										Pulverize G29 and H29 for analyses at laboratory.									
Emergency & Rush T/A data available via LabLink		Sample Custody must be documented below each time sample change possession, including courier delivery.		Sample inventory is verified upon receipt in the Laboratory																			
Relinquished By: [Signature]		Date Time: 8/29/19 1334		Received By: [Signature]		Date Time: 1700		Relinquished By: [Signature]		Date Time: 5:21-19		Received By: [Signature]		Date Time: 2		Received By: [Signature]		Date Time: 4		Custody Seal: 19366		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact <input type="checkbox"/> Preserved where applicable On Ice Cooler Temp: 26.6 FF	

5.2
5



Report of Analysis

Client Sample ID: FB(20190529) Lab Sample ID: JC88881-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 05/29/19 Date Received: 05/29/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	05/29/19 23:26	EB	SW846 7196A
Redox Potential Vs H2	492		mv	1	05/30/19 18:49	EB	ASTM D1498-76
pH ^a	6.47		su	1	05/29/19 15:28	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F29D	Date Sampled: 05/29/19
Lab Sample ID: JC88881-2	Date Received: 05/29/19
Matrix: SO - Soil	Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49	0.49	mg/kg	1	05/31/19 14:36	NV	SW846 3060A/7196A
Redox Potential Vs H2	222		mv	1	05/31/19 14:20	JOO	ASTM D1498-76M
Solids, Percent	82.2		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	8.12 J		su	1	05/31/19 14:20	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G29		Date Sampled: 05/29/19
Lab Sample ID: JC88881-3		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	05/31/19 14:41	NV	SW846 3060A/7196A
Redox Potential Vs H2	580		mv	1	05/31/19 14:25	JOO	ASTM D1498-76M
Solids, Percent	77.2		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	5.91 J		su	1	05/31/19 14:25	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H29	Date Sampled: 05/29/19
Lab Sample ID: JC88881-4	Date Received: 05/29/19
Matrix: SO - Soil	Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	05/31/19 14:41	NV	SW846 3060A/7196A
Redox Potential Vs H2	484		mv	1	05/31/19 14:41	JOO	ASTM D1498-76M
Solids, Percent	84.7		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	6.29 J		su	1	05/31/19 14:41	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-5		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.47	mg/kg	1	05/31/19 14:41	NV	SW846 3060A/7196A
Redox Potential Vs H2	375		mv	1	05/31/19 14:54	JOO	ASTM D1498-76M
Solids, Percent	85.7		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	8.31 J		su	1	05/31/19 14:54	JOO	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-H28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-6		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.47	mg/kg	1	05/31/19 14:41	NV	SW846 3060A/7196A
Redox Potential Vs H2	326		mv	1	05/31/19 14:58	JOO	ASTM D1498-76M
Solids, Percent	84.3		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	8.52 J		su	1	05/31/19 14:58	JOO	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-G28	Date Sampled: 05/29/19
Lab Sample ID: JC88881-7	Date Received: 05/29/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	05/31/19 14:41	NV	SW846 3060A/7196A
Redox Potential Vs H2	321		mv	1	05/31/19 15:03	JOO	ASTM D1498-76M
Solids, Percent	84.2		%	1	05/30/19 14:14	BG	SM2540 G 18TH ED MOD
pH	8.49 J		su	1	05/31/19 15:00	JOO	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190529)		Date Sampled: 05/29/19
Lab Sample ID: JC88881-1A		Date Received: 05/29/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15394

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190529)		Date Sampled: 05/29/19
Lab Sample ID: JC88881-1A		Date Received: 05/29/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	05/30/19 14:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F29D		Date Sampled: 05/29/19
Lab Sample ID: JC88881-2A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	21.3	1.3	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	38.2	5.0	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	6.3	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F29D		Date Sampled: 05/29/19
Lab Sample ID: JC88881-2A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 82.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.8	1.8	mg/kg	1	05/30/19 14:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G29		Date Sampled: 05/29/19
Lab Sample ID: JC88881-3A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	16.0	1.3	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	1550	10	mg/kg	2	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	6.3	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G29	Date Sampled: 05/29/19
Lab Sample ID: JC88881-3A	Date Received: 05/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.0	1.8	mg/kg	1	05/30/19 14:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H29		Date Sampled: 05/29/19
Lab Sample ID: JC88881-4A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	10.3	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	27.5	4.9	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	13.0	6.1	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H29		Date Sampled: 05/29/19
Lab Sample ID: JC88881-4A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.3	1.7	mg/kg	1	05/30/19 14:42	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-5A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	31.4	1.2	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	57.1	4.7	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.4	5.9	mg/kg	1	05/30/19	05/30/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-F28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-5A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.1	1.7	mg/kg	1	05/30/19 14:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-6A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	28.7	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	79.7	4.8	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.2	6.0	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-H28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-6A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.3	1.7	mg/kg	1	05/30/19 15:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-7A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	21.1	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	58.3	4.7	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.6	5.8	mg/kg	1	05/30/19	05/30/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46820

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-G28		Date Sampled: 05/29/19
Lab Sample ID: JC88881-7A		Date Received: 05/29/19
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.1	1.7	mg/kg	1	05/30/19 15:23	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC89131, JC89215, JC89357, JC89587, and JC89754

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34341R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC89131, JC89215, JC89357, JC89587, and JC89754 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC89131	FB(20190603)	JC89131-1	Water	6/3/2019		X	X	X
	CS-F25	JC89131-2	Soil	6/3/2019		X	X	X
JC89215	FB(20190604)	JC89215-1	Water	6/4/2019		X	X	X
	CS-G26	JC89215-2	Soil	6/4/2019		X	X	X
	BS-H26	JC89215-3	Soil	6/4/2019		X	X	X
	BS-I26	JC89215-4	Soil	6/4/2019		X	X	X
JC89357	FB(20190606)	JC89357-1	Water	6/6/2019		X	X	X
	BS-I20	JC89357-2	Soil	6/6/2019		X	X	X
	BS-G26	JC89357-3	Soil	6/6/2019		X	X	X
JC89587	FB(20190610)	JC89587-1	Water	6/10/2019		X	X	X
	BS-H31	JC89587-2	Soil	6/10/2019		X	X	X
JC89754	FB(20190612)	JC89754-1	Water	6/12/2019		X	X	X
	BS-G31	JC89754-2	Soil	6/12/2019		X	X	X
	BS-I21	JC89754-3	Soil	6/12/2019		X	X	X
	BS-I25	JC89754-4	Soil	6/12/2019		X	X	X
	BS-H25	JC89754-5	Soil	6/12/2019		X	X	X
	CS-H25	JC89754-6	Soil	6/12/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC89215, JC89587, and JC89754: Miscellaneous parameters for samples BS-H26, BS-H31, and BS-G31 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed using a sample from these SDGs.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis was not performed using a sample from these SDGs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a

DATA REVIEW REPORT

10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed using a sample from these SDGs.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

SDG #JC89191, JC89215, and JC89357: Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

SDGs #JC89587 and JC89754: Hexavalent chromium was detected in the associated method blanks; however, the associated sample results were non-detect. No qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

DATA REVIEW REPORT

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC89131: The MS analysis performed on sample location CS-F25 in association with the soluble and insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC89357, JC89587, and JC89754: The MS analysis performed on sample locations BS-G26, BS-H31, and BS-G31 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC89215, JC89357, JC89587, and JC89754: The MS analysis performed on sample locations BS-H26, BS-G26, BS-H31, and BS-G31 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H26	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	63.8%	66.9%
BS-G26	Hexavalent Chromium, Soluble	68.0%	AC (89.1%)
BS-H31	Hexavalent Chromium, Soluble	50.6%	< 50%
BS-G31	Hexavalent Chromium, Soluble	< 50%	< 50%

Notes:

AC Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

DATA REVIEW REPORT

SDGs #JC89215, JC89587, and JC89754: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC89357: The reanalysis of the field samples are usable. No qualification of the results was required.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC89131, JC89357, and JC89754: The PDS analysis performed on sample locations CS-F25, BS-G26, and BS-G31 exhibited recoveries within the control limits.

SDGs #JC89215 and JC89587: The PDS analysis performed on sample locations BS-H26, BS-H31 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-H26	Hexavalent Chromium	< 85%	< 85%
BS-H31	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs # JC89215 and JC89754: The laboratory duplicate analysis performed on sample locations BS-H26 and BS-G31 exhibited results within the control limit.

DATA REVIEW REPORT

SDG #JC89131, JC89357, and JC89587: The laboratory analysis performed on sample location CS-F25, BS-G26, and BS-H31 exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD	Reanalysis Laboratory Duplicate RPD
CS-F25	Hexavalent Chromium	26.1%	NA
BS-G26	Hexavalent Chromium	AC (20.0%)	105%
BS-H31	Hexavalent Chromium	23.5%	AC (< ± RL)

Notes:

AC Acceptable

NA Reanalysis not required

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	± RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
CS-F25	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
BS-I20		Analysis: 2 days	
BS-G26			
BS-H31			
BS-H26	ASTM D3872-86	Analysis: 24 days	< 24 hours from collection
BS-H31		Analysis: 18 days	
BS-G31		Analysis: 16 days	
BS-H26	SM4500S2-A	Analysis: 24 days	7 days from collection
BS-H31		Analysis: 18 days	
BS-G31		Analysis: 16 days	
BS-H26	Lloyd Kahn	Analysis: 24 days	14 days from collection
BS-H31		Analysis: 18 days	
BS-G31		Analysis: 16 days	

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

6. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

7. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

8. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC89131: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs # JC89215, JC89357, JC89587, and JC89754: The laboratory duplicate analysis performed on sample locations BS-H26, FB(20190606), BS-I20, BS-H31, and BS-G31 exhibited results within the control limit.

DATA REVIEW REPORT

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

10. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 10, 2019

PEER REVIEW: Dennis Capria

DATE: October 20, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SOL
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

JC89131

CP
/E

FED-EX Tracking #
SGS Quote #
Bottle Order Control # AR-042219-193
SGS Job # JC89131

Client / Reporting Information			Project Information			Requested Analysis										Matrix Codes								
Company Name: Arcadis			Project Name: PPH Jersey City Site 107			Total Chromium Trivalent Chromium Hexavalent Chromium Ammonium Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank								
Street Address: 10 Friends Lane			Street: 18 Chapel Ave																					
City: Newton PA 18940			City: Jersey City NJ																					
Project Contact: Karla Mariscal			Project #: NR000770.3.1A																					
Phone #: 610.355.7080			Client Purchase Order #													LAB USE ONLY A74 B11 D50 CR05H								
Samples Name(s): Chapel Circle 24			Project Manager: Tim McLoughlin																					
Phone #			Attention:																					
Collection																								
SGS Sample #	Field ID / Point of Collection	MEQ/HDl Val #	Date	Time	Sampled by	Grab (G) (Cont.)	Matrix	# of bottles	MC	INCH	INSD	INSA	INNE	INWB	INWH	ENCODE								
1	FB(20110603)		6/3/11	0700	CC	G	FB	4								X								
2	CS-F25		6/3/11	1000	CC	G	C	1								X								
Turn Around Time (Business Days)			Deliverable			Comments / Special Instructions																		
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days STAT <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other <small>All data available via Lablink</small>			Approved By (SGS PM) / Date: _____ Approved By (SGS PM) / Date: _____ Approved By (SGS PM) / Date: _____ Approved By (SGS PM) / Date: _____ * Approval needed for 1-3 Business Day TAT			<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP			<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format			<input type="checkbox"/> DOD-QSMS			Pulverize sample as needed.									
<small>Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Initial Raw data http://www.sgs.com/en/terms-and-conditions</small>																								
Sample Custody must be documented below each time samples change of possession, including courier delivery.																								
Relinquished by: [Signature]	Date / Time: 6/3/11 1250	Received by: [Signature]	Date / Time: 6-3-11	Relinquished by: [Signature]	Date / Time: 6-3-11	Received by: [Signature]	Date / Time: 6-3-11	Relinquished by: [Signature]	Date / Time: 6-3-11	Received by: [Signature]	Date / Time: 6-3-11	Relinquished by: [Signature]	Date / Time: 6-3-11	Received by: [Signature]	Date / Time: 6-3-11	Relinquished by: [Signature]	Date / Time: 6-3-11							
Custody # 24526			Intact <input checked="" type="checkbox"/> Not intact <input type="checkbox"/>			Preserved where applicable <input type="checkbox"/>			On Ice <input checked="" type="checkbox"/> Cooler Temp. °C 2.1C			Therm. ID: IP												

5.2
5

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Report of Analysis

Client Sample ID: FB(20190603)	Date Sampled: 06/03/19
Lab Sample ID: JC89131-1	Date Received: 06/03/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/03/19 22:53	MO	SW846 7196A
Redox Potential Vs H2	359		mv	1	06/06/19 11:01	MS	ASTM D1498-76
pH ^a	6.86		su	1	06/03/19 17:48	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-F25		Date Sampled: 06/03/19
Lab Sample ID: JC89131-2		Date Received: 06/03/19
Matrix: SO - Solid		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	567 J	12	mg/kg	25	06/06/19 13:29	RI	SW846 3060A/7196A
Redox Potential Vs H2	93.5		mv	1	06/07/19 17:24	JOO	ASTM D1498-76M
Solids, Percent	83.5		%	1	06/05/19 14:44	RC	SM2540 G 18TH ED MOD
pH	12.11 J		su	1	06/07/19 17:25	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190603) Lab Sample ID: JC89131-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/03/19 Date Received: 06/03/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/04/19	06/06/19 GT	SW846 6010D ²	SW846 3010A ³
Chromium	< 10	10	ug/l	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10	10	ug/l	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ³
Thallium	< 10	10	ug/l	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ³
Vanadium	< 50	50	ug/l	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ³

(1) Instrument QC Batch: MA46860

(2) Instrument QC Batch: MA46866

(3) Prep QC Batch: MP15465

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190603)		Date Sampled: 06/03/19
Lab Sample ID: JC89131-1A		Date Received: 06/03/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/05/19 14:21	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-F25		Date Sampled: 06/03/19
Lab Sample ID: JC89131-2A		Date Received: 06/03/19
Matrix: SO - Solid		Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.6	4.6	mg/kg	2	06/04/19	06/06/19 GT	SW846 6010D ²	SW846 3050B ³
Chromium ^a	1100	2.3	mg/kg	2	06/04/19	06/06/19 GT	SW846 6010D ²	SW846 3050B ³
Nickel	18.2	4.6	mg/kg	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.1	1.1	mg/kg	1	06/04/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ³
Vanadium ^a	36.7	11	mg/kg	2	06/04/19	06/06/19 GT	SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA46860

(2) Instrument QC Batch: MA46866

(3) Prep QC Batch: MP15484

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-F25	Date Sampled: 06/03/19
Lab Sample ID: JC89131-2A	Date Received: 06/03/19
Matrix: SO - Solid	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	533	14	mg/kg	1	06/06/19 12:20	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



SO, SOL
FB
h

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusua

CP/E

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes			
Company Name: Apex Dis Address: 10 Friends Lane, Suite 100 City: Newtown Pa 18940 Project Contact: Karla M. Taccola Phone #: 610-755-7081 Sample Name(s): Christina C.elli 2012482005		Project Name: PPG Jersey City Site 107 Street: 18 Chapel Ave City: Jersey City NJ Billing Information (if different from Report to): Company Name: Street Address: City: State Zip:		Total Phosphorus Trivalent Chromium Hexavalent Chromium Antimony Nickel Tantalum Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
SGS Sample #	Field ID / Point of Collection	MECH/DI Val #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	HCl	MACH	PHOS	TURB	NONE	D/V	MECH	ENCLOS	LAB USE ONLY
1	FB(20190604)		6/4/19	0830	CC	G	FB	4									A27
2	CS-626		6/4/19	1000	CC	G	C	1									B70
3	BS-H26		6/4/19	1215	CC	G	SO	1									C36
4	BS-I26		6/4/19	1200	CC	G	SO	1									CRUSH
Turn Around Time (Business Days)		Approved By (SGS PM) / Date:		Deliverable		Comments / Special Instructions											
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format: EQW		Pulverize sample as needed for analyses of H26 and I26 and CS-626 http://www.sgs.com/en/terms-and-conditions											
All data available via Lablink * Approval needed for 1-3 Business Day TAT. Sample Custody must be documented below each time samples change possession, including courier delivery.																	
Relinquished by: CC	Date / Time: 6/4/19 1300	Received by: 1 Robert Schaubert	Date / Time: 6-4-19	Relinquished by: 2 Robert Schaubert	Date / Time: 6-4-19	Received by: 3	Date / Time: 6-4-19	Relinquished by: 4	Date / Time: 6-4-19	Received by: 5	Date / Time: 6-4-19	Received by: 6	Date / Time: 6-4-19	Received by: 7	Date / Time: 6-4-19	Received by: 8	Date / Time: 6-4-19
Custody Seal # 14150 <input type="checkbox"/> Inact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent <input type="checkbox"/> Therm ID: 7p 3.2 oc																	

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5.2 5



Report of Analysis

Client Sample ID: FB(20190604)		Date Sampled: 06/04/19
Lab Sample ID: JC89215-1		Date Received: 06/04/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/04/19 23:52	EB	SW846 7196A
Redox Potential Vs H2	362		mv	1	06/06/19 11:02	MS	ASTM D1498-76
pH ^a	6.45		su	1	06/04/19 20:18	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-G26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-2	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71 J-	0.46	mg/kg	1	06/07/19 13:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	337		mv	1	06/05/19 22:10	EB	ASTM D1498-76M
Solids, Percent	87		%	1	06/05/19 17:00	BG	SM2540 G 18TH ED MOD
pH	8.14		su	1	06/05/19 22:15	EB	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-3	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.99 J-	0.61	mg/kg	1	06/07/19 13:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	06/05/19 23:10	EB	ASTM D1498-76M
Solids, Percent	66.1		%	1	06/05/19 17:00	BG	SM2540 G 18TH ED MOD
pH	6.98		su	1	06/05/19 23:13	EB	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-4	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 69.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.58 UJ-	0.58	mg/kg	1	06/07/19 13:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	308		mv	1	06/05/19 23:12	EB	ASTM D1498-76M
Solids, Percent	69.4		%	1	06/05/19 17:00	BG	SM2540 G 18TH ED MOD
pH	6.77		su	1	06/05/19 23:15	EB	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-G26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-2R	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.46	mg/kg	1	06/11/19 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-3R	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.61	0.61	mg/kg	1	06/11/19 16:35	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H26		Date Sampled: 06/04/19
Lab Sample ID: JC89215-3RT		Date Received: 06/04/19
Matrix: SO - Solid		Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.1 J	0.20	%	1	06/28/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/28/19 12:00	MP	SM4500S2 - A 11 R
Total Organic Carbon ^c	147000 J	150	mg/kg	1	06/28/19 11:23	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-4R	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 69.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.58	0.58	mg/kg	1	06/11/19 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190604)	Date Sampled: 06/04/19
Lab Sample ID: JC89215-1A	Date Received: 06/04/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46860

(2) Prep QC Batch: MP15512

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190604)	Date Sampled: 06/04/19
Lab Sample ID: JC89215-1A	Date Received: 06/04/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/05/19 18:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-G26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-2A	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	35.0	1.1	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.6	4.4	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	12.6	5.5	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46862

(2) Prep QC Batch: MP15499

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-G26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-2A	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.3	1.6	mg/kg	1	06/05/19 19:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-3A	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	77.1	1.5	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	206	6.0	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	44.5	7.5	mg/kg	1	06/05/19	06/05/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46862

(2) Prep QC Batch: MP15499

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-3A	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 66.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	76.1	2.1	mg/kg	1	06/05/19 19:24	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I26	Date Sampled: 06/04/19
Lab Sample ID: JC89215-4A	Date Received: 06/04/19
Matrix: SO - Solid	Percent Solids: 69.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.8	2.8	mg/kg	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	9.5	1.4	mg/kg	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	25.8	5.6	mg/kg	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.4	7.0	mg/kg	1	06/05/19	06/05/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46862

(2) Prep QC Batch: MP15499

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I26		Date Sampled: 06/04/19
Lab Sample ID: JC89215-4A		Date Received: 06/04/19
Matrix: SO - Solid		Percent Solids: 69.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.0	2.0	mg/kg	1	06/05/19 19:29	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



SO
FB

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SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3498/3480
www.sgs.com/ehausa

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes																																																																
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium							GW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																																																																
Street Address: 10 Frigards Lane		Street: 18 Chapel Ave																																																																																	
City: Newark State: PA Zip: 18940		City: Jersey City State: NJ																																																																																	
Project Contact: Krista Matorcola E-mail: 610.755.7080		Project #: NP000770.0003.1480 Street Address: 																																																																																	
Phone #: 610.755.7080		Client Purchase Order #: City: State: Zip: 										LAB USE ONLY A9 G57 B25																																																																							
Suggest(s) Name(s): Chrishon Cobelli Phone #: 201.241.8005		Project Manager: Jim McLoyella Attention: 																																																																																	
Collection		Number of preserved Bottles																																																																																	
<table border="1"> <thead> <tr> <th>SGS sample #</th> <th>Field ID / Point of Collection</th> <th>MEQ/ML Vial #</th> <th>Date</th> <th>Time</th> <th>Sampled by</th> <th>Case (S) (Conts)(C)</th> <th>Matrix</th> <th># of bottles</th> <th>HCl</th> <th>NO₃</th> <th>NO₂</th> <th>NO₃</th> <th>NO₂</th> <th>IN</th> <th>IN</th> <th>IN</th> <th>IN</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>FB(20190606)</td> <td></td> <td>6/6/19</td> <td>1100</td> <td>CC</td> <td>G</td> <td>FB</td> <td>4</td> <td></td> <td></td> <td></td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>PS-I20</td> <td></td> <td>6/6/19</td> <td>0900</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>BS-G26</td> <td></td> <td>6/6/19</td> <td>1230</td> <td>CC</td> <td>G</td> <td>SO</td> <td>1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		SGS sample #	Field ID / Point of Collection	MEQ/ML Vial #	Date	Time	Sampled by	Case (S) (Conts)(C)	Matrix	# of bottles	HCl		NO ₃	NO ₂	NO ₃	NO ₂	IN	IN	IN	IN	1	FB(20190606)		6/6/19	1100	CC	G	FB	4				2	2					2	PS-I20		6/6/19	0900	CC	G	SO	1				1						3	BS-G26		6/6/19	1230	CC	G	SO	1				1														
SGS sample #	Field ID / Point of Collection	MEQ/ML Vial #	Date	Time	Sampled by	Case (S) (Conts)(C)	Matrix	# of bottles	HCl	NO ₃	NO ₂	NO ₃	NO ₂	IN	IN	IN	IN																																																																		
1	FB(20190606)		6/6/19	1100	CC	G	FB	4				2	2																																																																						
2	PS-I20		6/6/19	0900	CC	G	SO	1				1																																																																							
3	BS-G26		6/6/19	1230	CC	G	SO	1				1																																																																							
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions																																																																							
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other _____		Approved by (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> DOD-QSMS							INITIAL ASSESSMENT 3B/JP LABEL VERIFICATION _____																																																																
<input type="checkbox"/> All data available via Lablink * Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions																																																																							
Sample Custody must be documented below each time samples change possession, including courier delivery.																																																																																			
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5.2
5



Report of Analysis

Client Sample ID: FB(20190606)	Date Sampled: 06/06/19
Lab Sample ID: JC89357-1	Date Received: 06/06/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/07/19 00:55	EB	SW846 7196A
Redox Potential Vs H2	352		mv	1	06/07/19 09:32	MS	ASTM D1498-76
pH ^a	6.06		su	1	06/06/19 17:40	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I20	Date Sampled: 06/06/19
Lab Sample ID: JC89357-2	Date Received: 06/06/19
Matrix: SO - Soil	Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.67	mg/kg	1	06/09/19 14:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	235		mv	1	06/08/19 16:14	JOO	ASTM D1498-76M
Solids, Percent	59.7		%	1	06/07/19 09:30	RC	SM2540 G 18TH ED MOD
pH	6.78 J		su	1	06/08/19 16:14	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G26		Date Sampled: 06/06/19
Lab Sample ID: JC89357-3		Date Received: 06/06/19
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.7	0.49	mg/kg	1	06/09/19 14:24	NV	SW846 3060A/7196A
Redox Potential Vs H2	236		mv	1	06/08/19 16:18	JOO	ASTM D1498-76M
Solids, Percent	81		%	1	06/07/19 09:30	RC	SM2540 G 18TH ED MOD
pH	8.02 J		su	1	06/08/19 16:22	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I20		Date Sampled: 06/06/19
Lab Sample ID: JC89357-2R		Date Received: 06/06/19
Matrix: SO - Soil		Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.67 UJ	0.67	mg/kg	1	06/13/19 12:09	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G26	Date Sampled: 06/06/19
Lab Sample ID: JC89357-3R	Date Received: 06/06/19
Matrix: SO - Soil	Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.6 J	0.49	mg/kg	1	06/13/19 12:06	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190606) Lab Sample ID: JC89357-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/06/19 Date Received: 06/06/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/07/19	06/10/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/07/19	06/10/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/07/19	06/10/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/07/19	06/10/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/07/19	06/10/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46882

(2) Prep QC Batch: MP15542

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190606)	Date Sampled: 06/06/19
Lab Sample ID: JC89357-1A	Date Received: 06/06/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/10/19 14:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I20 Lab Sample ID: JC89357-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/06/19 Date Received: 06/06/19 Percent Solids: 59.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.4	3.4	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ³
Chromium	20.9	1.7	mg/kg	1	06/07/19	06/10/19 ND	SW846 6010D ²	SW846 3050B ³
Nickel	20.3	6.7	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.7	1.7	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ³
Vanadium	34.9	8.4	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46877
- (2) Instrument QC Batch: MA46882
- (3) Prep QC Batch: MP15335

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I20		Date Sampled: 06/06/19
Lab Sample ID: JC89357-2A		Date Received: 06/06/19
Matrix: SO - Soil		Percent Solids: 59.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.3 20.9	2.4	mg/kg	1	06/10/19 14:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G26 Lab Sample ID: JC89357-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/06/19 Date Received: 06/06/19 Percent Solids: 81.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	62.5	1.2	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	48.4	5.0	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.2	6.2	mg/kg	1	06/07/19	06/07/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46877

(2) Prep QC Batch: MP15335

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G26		Date Sampled: 06/06/19
Lab Sample ID: JC89357-3A		Date Received: 06/06/19
Matrix: SO - Soil		Percent Solids: 81.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.8 58.9	1.7	mg/kg	1	06/07/19 17:55	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4



SP
PB

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2235 Route 130, Dayton, NJ 08610
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehusa

6

Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane City: Newtown PA 18940 Project Contact: Krista Mastrocola Phone #: 610-755-7080 Sampler(s) Name(s): C. Cifelli 201-264-8065		Project Information Project Name: PP & Jersey City Site 107 Street: 18 Chapel Ave City: Jersey City NJ Project #: NP000770.003.1A00 Project Manager: Jim McLaughlin		FED-EX Tracking # SGS Quote #: JC89587		Bottle Order Control # SGS Job #	
Requested Analysis Total chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium		Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank					
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DRGP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format		Comments / Special Instructions INITIAL ASSESSMENT 3AD LABEL VERIFICATION	
Approved By (SGS PM): / Date: _____ * Approval needed for 1-3 Business Day TAT							
Sample Custody must be documented below each time samples change possession, including courier delivery.							
Relinquished by: [Signature] Date / Time: 06/10/19 11:30		Received by: Robert drambas Date / Time: 6-10-19		Relinquished by: Robert drambas Date / Time: 6-10-19		Received by: [Signature] Date / Time: 6-10-19	
Relinquished by: 3 Date / Time:		Received by: 3 Date / Time:		Relinquished by: 4 Date / Time:		Received by: 4 Date / Time:	
Relinquished by: 5 Date / Time:		Received by: 5 Date / Time:		Custody Seal: 17944 <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		Preserved where applicable: <input type="checkbox"/> Absent <input checked="" type="checkbox"/> On Ice Cooler Temp: 3.0°C	

5.2
5



Report of Analysis

Client Sample ID: FB(20190610)		Date Sampled: 06/10/19
Lab Sample ID: JC89587-1		Date Received: 06/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/10/19 23:16	EB	SW846 7196A
Redox Potential Vs H2	297		mv	1	06/11/19 14:55	MS	ASTM D1498-76
pH ^a	5.37		su	1	06/10/19 17:26	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H31	Date Sampled: 06/10/19
Lab Sample ID: JC89587-2	Date Received: 06/10/19
Matrix: SO - Soil	Percent Solids: 75.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.6 J	0.53	mg/kg	1	06/12/19 11:28	RI	SW846 3060A/7196A
Redox Potential Vs H2	630		mv	1	06/12/19 09:59	RI	ASTM D1498-76M
Solids, Percent	75.4		%	1	06/11/19 08:20	RC	SM2540 G 18TH ED MOD
pH	3.92 J		su	1	06/12/19 09:49	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H31	Date Sampled: 06/10/19
Lab Sample ID: JC89587-2R	Date Received: 06/10/19
Matrix: SO - Soil	Percent Solids: 75.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.80	0.53	mg/kg	1	06/14/19 12:55	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H31	Date Sampled: 06/10/19
Lab Sample ID: JC89587-2RT	Date Received: 06/10/19
Matrix: SO - Soil	Percent Solids: 75.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.27 J	0.20	%	1	06/28/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/28/19 12:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	386000 J	130	mg/kg	1	06/28/19 15:54	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190610)	Date Sampled: 06/10/19
Lab Sample ID: JC89587-1A	Date Received: 06/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/11/19	06/12/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/11/19	06/12/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/11/19	06/12/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/11/19	06/12/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/11/19	06/12/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46896

(2) Prep QC Batch: MP15594

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190610)	Date Sampled: 06/10/19
Lab Sample ID: JC89587-1A	Date Received: 06/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/12/19 08:42	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H31	Date Sampled: 06/10/19
Lab Sample ID: JC89587-2A	Date Received: 06/10/19
Matrix: SO - Soil	Percent Solids: 75.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	06/11/19	06/11/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	360	1.3	mg/kg	1	06/11/19	06/11/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	58.4	5.3	mg/kg	1	06/11/19	06/11/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/11/19	06/11/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	22.8	6.6	mg/kg	1	06/11/19	06/11/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46892

(2) Prep QC Batch: MP15592

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H31		Date Sampled: 06/10/19
Lab Sample ID: JC89587-2A		Date Received: 06/10/19
Matrix: SO - Soil		Percent Solids: 75.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	352	1.8	mg/kg	1	06/11/19 18:24	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing Client/Reporting Information, Project Information, Requested Analysis, Matrix Codes, Collection table, Turn Around Time, Deliverables, and Chain of Custody tracking.

5.2
5

CIP 3.7



Report of Analysis

Client Sample ID: FB(20190612)		Date Sampled: 06/12/19
Lab Sample ID: JC89754-1		Date Received: 06/12/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/12/19 23:35	EB	SW846 7196A
Redox Potential Vs H2	311		mv	1	06/13/19 10:14	MS	ASTM D1498-76
pH ^a	5.54		su	1	06/12/19 20:15	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G31	Date Sampled: 06/12/19
Lab Sample ID: JC89754-2	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.7 J-	0.46	mg/kg	1	06/14/19 11:52	RI	SW846 3060A/7196A
Redox Potential Vs H2	360		mv	1	06/13/19 18:14	JOO	ASTM D1498-76M
Solids, Percent	86.3		%	1	06/13/19 08:57	RI	SM2540 G 18TH ED MOD
pH	7.21		su	1	06/13/19 18:14	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I21	Date Sampled: 06/12/19
Lab Sample ID: JC89754-3	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 56.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.71 UJ-	0.71	mg/kg	1	06/14/19 11:57	RI	SW846 3060A/7196A
Redox Potential Vs H2	211		mv	1	06/13/19 18:24	JOO	ASTM D1498-76M
Solids, Percent	56.4		%	1	06/13/19 08:57	RI	SM2540 G 18TH ED MOD
pH	6.33		su	1	06/13/19 18:24	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-4	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/14/19 11:57	RI	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	06/13/19 18:39	JOO	ASTM D1498-76M
Solids, Percent	82.6		%	1	06/13/19 08:57	RI	SM2540 G 18TH ED MOD
pH	7.19		su	1	06/13/19 18:39	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-5	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.8 J-	0.50	mg/kg	1	06/14/19 11:57	RI	SW846 3060A/7196A
Redox Potential Vs H2	409		mv	1	06/13/19 18:44	JOO	ASTM D1498-76M
Solids, Percent	79.5		%	1	06/13/19 08:57	RI	SM2540 G 18TH ED MOD
pH	4.69		su	1	06/13/19 18:38	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-H25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-6	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.48	mg/kg	1	06/14/19 11:57	RI	SW846 3060A/7196A
Redox Potential Vs H2	360		mv	1	06/13/19 18:51	JOO	ASTM D1498-76M
Solids, Percent	83.5		%	1	06/13/19 08:57	RI	SM2540 G 18TH ED MOD
pH	6.91		su	1	06/13/19 18:43	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G31	Date Sampled: 06/12/19
Lab Sample ID: JC89754-2R	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.5	0.46	mg/kg	1	06/18/19 15:21	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-I21	Date Sampled: 06/12/19
Lab Sample ID: JC89754-3R	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 56.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	28.7	0.71	mg/kg	1	06/18/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-4R	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	06/18/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-5R	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.50	mg/kg	1	06/18/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-H25	Date Sampled: 06/12/19
Lab Sample ID: IC89754-6R	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.7	0.48	mg/kg	1	06/18/19 15:27	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G31	Date Sampled: 06/12/19
Lab Sample ID: JC89754-2RT	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.46 J	0.20	%	1	06/28/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	06/28/19 12:00	MP	SM4500S2 - A 11 R
Total Organic Carbon ^c	56600 J	120	mg/kg	1	06/28/19 12:44	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190612)	Date Sampled: 06/12/19
Lab Sample ID: JC89754-1A	Date Received: 06/12/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/13/19	06/14/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/13/19	06/14/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/13/19	06/14/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/13/19	06/14/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/13/19	06/14/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46914

(2) Prep QC Batch: MP15623

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190612)	Date Sampled: 06/12/19
Lab Sample ID: JC89754-1A	Date Received: 06/12/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/14/19 00:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G31	Date Sampled: 06/12/19
Lab Sample ID: JC89754-2A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	166	1.1	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.9	4.6	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	21.6	5.7	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46910

(2) Prep QC Batch: MP15630

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G31	Date Sampled: 06/12/19
Lab Sample ID: JC89754-2A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	162	1.6	mg/kg	1	06/13/19 15:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I21	Date Sampled: 06/12/19
Lab Sample ID: JC89754-3A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 56.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.5	3.5	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.3	1.7	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.7	7.0	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.7	1.7	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.6	8.7	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46910

(2) Prep QC Batch: MP15630

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I21	Date Sampled: 06/12/19
Lab Sample ID: JC89754-3A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 56.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.3	2.4	mg/kg	1	06/13/19 15:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-4A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	7.5	1.2	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.3	4.6	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	15.6	5.8	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46910

(2) Prep QC Batch: MP15630

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-4A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 82.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	7.5	1.7	mg/kg	1	06/13/19 15:55	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-H25 Lab Sample ID: JC89754-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/12/19 Date Received: 06/12/19 Percent Solids: 79.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 5.0	5.0	mg/kg	2	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	1210	2.5	mg/kg	2	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	134	5.0	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	25.4	13	mg/kg	2	06/13/19	06/13/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46910

(2) Prep QC Batch: MP15630

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-H25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-5A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1210	3.0	mg/kg	1	06/13/19 16:42	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-H25 Lab Sample ID: JC89754-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/12/19 Date Received: 06/12/19 Percent Solids: 83.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	58.9	47	mg/kg	20	06/13/19	06/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	38.4	1.2	mg/kg	1	06/13/19	06/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	8380	93	mg/kg	20	06/13/19	06/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	06/13/19	06/13/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.5	5.8	mg/kg	1	06/13/19	06/13/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46910

(2) Prep QC Batch: MP15630

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-H25	Date Sampled: 06/12/19
Lab Sample ID: JC89754-6A	Date Received: 06/12/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.7	1.7	mg/kg	1	06/13/19 16:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC89903, JC90062, JC90188, JC90225, and JC90846

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34342R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC89903, JC90062, JC90188, JC90225, and JC90846 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC89903	FB(20190614)	JC89903-1	Water	6/14/2019		X	X	X
	BS-H10A	JC89903-2	Soil	6/14/2019		X	X	X
JC90062	CS-MSA	JC90062-1	Soil	6/17/2019		X	X	X
JC90188	BS-G11	JC90188-1	Soil	6/19/2019		X	X	X
	BS-H11	JC90188-2	Soil	6/19/2019		X	X	X
	BS-G10A	JC90188-3	Soil	6/19/2019		X	X	X
	BS-I21A	JC90188-4	Soil	6/19/2019		X	X	X
	FB(20190619)	JC90188-5	Water	6/19/2019		X	X	X
JC90225	FB(20190620)	JC90225-1	Water	6/20/2019		X	X	X
	FD005	JC90225-2	Soil	6/20/2019		X	X	X
	BS-I23	JC90225-3	Soil	6/20/2019		X	X	X
	BS-I24	JC90225-4	Soil	6/20/2019		X	X	X
	BS-I22	JC90225-5	Soil	6/20/2019		X	X	X
	FD-006	JC90225-6	Soil	6/20/2019		X	X	X
JC90846	FB(20190628)	JC90846-1	Water	6/28/2019		X	X	X
	BS-F10A	JC90846-2	Soil	6/28/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC89903, JC90062, JC90188, JC90225, and JC90846: Miscellaneous parameters for samples BS-H10A, CS-MSA (crushed), BS-G11, FD005, and BS-F10A also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

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INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

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All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC89903, JC90188, JC90225, and JC90846: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC90062: The MS/MSD analysis performed on sample location CS-MSA (crushed) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
CS-MSA (crushed)	Antimony	39.8%	36.2%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

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Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC89903, JC90188, JC90225, and JC90846: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC90062: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample CS-MSA (crushed). The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC89903, JC90188, JC90225, and JC90846: The serial dilution analysis was not performed using a sample from these SDGs.

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SDG #JC90062: The serial dilution performed on sample location CS-MSA (crushed) exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC90062: The MS analysis performed on sample location CS-MSA in association with the soluble and insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDG #JC90846: The MS analysis performed on sample location BS-F10A in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC89903, JC90062, JC90188, JC90225, and JC90846: The MS analysis performed on sample locations BS-H10A, CS-MSA (crushed), BS-G11, FD005, and BS-F10A exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H10A	Hexavalent Chromium, Soluble	59.1%	51.7%
	Hexavalent Chromium, Insoluble	AC (77.6%)	69.1%
CS-MSA (crushed)	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	AC (114.6%)	71.1%
BS-G11	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	72.7%	< 50%
FD005	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	< 50%	< 50%
BS-F10A	Hexavalent Chromium, Soluble	54.2%	< 50%

Notes:

AC Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

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SDGs #JC89903, JC90062, JC90188, and JC90846: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC90225: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use (“RA” qualifier).

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDGs #JC89903, JC90062, JC90188, and JC90846: The PDS analysis performed on sample locations BS-H10A, CS-MSA, CS-MSA (crushed), BS-G11, and BS-F10A exhibited recoveries within the control limits.

SDG #JC90225: The PDS analysis performed on sample location FD005 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
FD005	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs # JC89903, JC90062, JC90188, JC90225, and JC90846: The laboratory duplicate analysis performed on sample locations BS-H10A, CS-MSA, CS-MSA (crushed), BS-G11, FD005, and BS-F10A exhibited results within the control limit.

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5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190614)	SM4500H+B	Analysis: 3 days	< 24 hours of receipt by laboratory
CS-MSA	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
BS-H10A		Analysis: 3 days	
BS-G11		Analysis: 5 days	
BS-H11			
BS-G10A			
BS-I21A			
FD005		Analysis: 6 days	
BS-I23			
BS-I24			
BS-I22			
FD-006	Analysis: 7 days		
CS-MSA (crushed)			
BS-F10A	ASTM D3872-86	Analysis: 13 days	< 24 hours from collection
BS-H10A		Analysis: 14 days	
FD005		Analysis: 21 days	

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Sample Locations	Method	Holding Time	Criteria
BS-G11		Analysis: 22 days	
CS-MSA (crushed)		Analysis: 24 days	
BS-F10A	SM4500S2-A	Analysis: 13 days	7 days from collection
BS-H10A		Analysis: 14 days	
FD005		Analysis: 21 days	
BS-G11		Analysis: 22 days	
CS-MSA (crushed)		Analysis: 24 days	
BS-F10A		Lloyd Kahn	
FD005	Analysis: 25 days		
BS-G11	Analysis: 26 days		
CS-MSA (crushed)	Analysis: 28 days		

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of

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acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC90225 and JC90846: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs # JC89903 and JC90062: The laboratory duplicate analysis performed on sample locations BS-H10A and CS-MSA (crushed) exhibited results within the control limit.

SDG #JC90188: The laboratory analysis performed on sample location BS-G11 exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD
BS-G11	TOC	53.5%

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 35%	Non-detect	UJ
		Detect	J
Parent sample and/or laboratory duplicate sample result < four times the RL	\pm RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

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6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 16, 2019

PEER REVIEW: Dennis Capria

DATE: October 20, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order # AK-042214173
SGS Quote #
SGS Job # JC89903

Client / Reporting Information			Project Information			Requested Analysis												Matrix Codes											
Compassy Name: <u>Acadus U.S., Inc</u>			Project Name: <u>PP6 Jersey City - Site 107</u>			<u>Total Chromium</u> <u>Tetra valent Chromium</u> <u>Hexavalent Chromium</u> <u>Antimony</u> <u>Nickel</u> <u>Barium</u> <u>Vanadium</u>												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank											
Street Address: <u>10 PALENCIA LANE SUITE 100</u>			Street: <u>16 Chapel Avenue</u>																										
City: <u>Newtown Pa 18940</u>			City: <u>Jersey City NJ</u>																										
Project Contact: <u>Krista MacTrasola</u> Phone # <u>610-755-2080</u> Email: <u>kdavid@chiliwinke.com</u>			Billing Information (if different from Report to) Company Name: <u>NP 000 730.0003.1A000</u> Street Address: <u></u> City: <u></u> State: <u></u> Zip: <u></u>																										
Project Manager: <u>Jim McLoughlin</u>			Attention: <u></u>																										
SSS Sample #	Field ID / Point of Collection	MECH/DI Val #	Date	Time	Sampled By	Grab (G) / Composite (C)	Matrix	# of bottles	Number of preserved Bottles											LAB USE ONLY									
									HCl	NO ₃	NO ₂	HSO ₄	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃	NO ₂	NO ₃		NO ₂								
1	FB-20190614		6/14/19	1310	DFAG	FB		2	2																				
2	BS-H10A		6/14/19	1245	DFH	SO		1																					
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other Approved by (SGS PM) / Date: _____ State: _____																Deliverables: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> DOD-QSMS												Comments / Special Instructions INITIAL ASSESSMENT <u>RA/EAN</u> ANAL VERIFICATION A20 G51 D70	
Retinquished by: <u>[Signature]</u> Date / Time: <u>6/14/19</u> Received By: <u>[Signature]</u> Date / Time: <u>6-14-19</u> Retinquished by: <u>[Signature]</u> Date / Time: _____ Received By: _____ Date / Time: _____ Retinquished by: _____ Date / Time: _____ Received By: _____ Date / Time: _____ Custody Seal # <u>04050</u> <input type="checkbox"/> Intact <input type="checkbox"/> Not intact Preserved where applicable <input type="checkbox"/> Absent Therm. ID: <u>3.7C</u>																													

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: FB(20190614)		Date Sampled: 06/14/19
Lab Sample ID: JC89903-1		Date Received: 06/14/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/14/19 23:47	EB	SW846 7196A
Redox Potential Vs H2	283		mv	1	06/17/19 11:24	MS	ASTM D1498-76
pH ^a	5.96 J		su	1	06/17/19 18:46	HM	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H10A	Date Sampled: 06/14/19
Lab Sample ID: JC89903-2	Date Received: 06/14/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/18/19 11:46	RI	SW846 3060A/7196A
Redox Potential Vs H2	386		mv	1	06/17/19 15:58	MS	ASTM D1498-76M
Solids, Percent	83.4		%	1	06/17/19 16:10	BG	SM2540 G 18TH ED MOD
pH	6.38 J		su	1	06/17/19 15:59	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H10A	Date Sampled: 06/14/19
Lab Sample ID: JC89903-2R	Date Received: 06/14/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88	0.48	mg/kg	1	06/24/19 17:46	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H10A		Date Sampled: 06/14/19
Lab Sample ID: JC89903-2RT		Date Received: 06/14/19
Matrix: SO - Soil		Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	06/28/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	06/28/19 12:00	MP	SM4500S2- A-11
Total Organic Carbon ^c	3220	120	mg/kg	1	06/28/19 14:07	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190614) Lab Sample ID: JC89903-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/14/19 Date Received: 06/14/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46935

(2) Prep QC Batch: MP15675

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190614)	Date Sampled: 06/14/19
Lab Sample ID: JC89903-1A	Date Received: 06/14/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/17/19 19:34	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H10A Lab Sample ID: JC89903-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/14/19 Date Received: 06/14/19 Percent Solids: 83.4
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3050B ²
Chromium	18.9	1.2	mg/kg	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3050B ²
Nickel	14.4	4.7	mg/kg	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.4	2.4	mg/kg	2	06/15/19	06/18/19 RP	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.8	5.9	mg/kg	1	06/15/19	06/17/19 RP	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46935

(2) Prep QC Batch: MP15592

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H10A	Date Sampled: 06/14/19
Lab Sample ID: JC89903-2A	Date Received: 06/14/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.5	1.7	mg/kg	1	06/17/19 22:18	RP	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4



50

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #

JC90062

Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes			
Company Name: Arcadis US Inc		Project Name: PPB Jersey City - Site 107		<i>Total Chromium</i> <i>Hexavalent Chromium</i> <i>Trivalent Chromium</i> <i>Antimony</i> <i>Nickel</i> <i>Thallium</i> <i>Vanadium</i>										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment GI - GI LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
Street Address: 10 Friends Lane Ste 100		Street: 18 Chapel Ave															
City: Newtown PA 18940		City: Jersey City NJ															
Project Contact: Krista Mastrocola		Project #: NP000770.0003.1A000															
Phone #: 610-755-7080		Client Purchase Order #												LAB USE ONLY			
Sampler(s) Name(s): Jim McLaughlin		Project Manager: Jim McLaughlin															
SGS Sample #	Field ID / Point of Collection	MEQ/MDI Val #	Date	Time	Sampled by	Grab (G) (Cont. C)	Matrix	# of bottles	HCl	NO ₃	NO ₂	HNO ₃	H ₂ SO ₄	NONE	DI Water	MEDIA	INDURE
1	CS - MSA		6/17/19	1245	JCM	C	1										

D27

<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other <small>All data available via Lablink</small>	Approved By (SGS PM) / Date: _____	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT MCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format	<input type="checkbox"/> DOD-QSMS	Comments / Special Instructions INITIAL ASSESSMENT _____ LABEL VERIFICATION _____
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Chain of Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: <i>[Signature]</i>	Date / Time: 6/17/19 1258	Received by: <i>[Signature]</i>	Date / Time: 6/17/19 1258	Relinquished by: <i>[Signature]</i>	Date / Time: 6/17/19 1807	Received by: <i>[Signature]</i>
Relinquished by:	Date / Time:	Received by:	Date / Time:	Relinquished by:	Date / Time:	Received by:
Relinquished by:	Date / Time:	Received by:	Date / Time:	Relinquished by:	Date / Time:	Received by:

ER 273 CIP 3.1



Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.8	0.49	mg/kg	1	06/19/19 12:30	NV	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	06/19/19 09:54	MS	ASTM D1498-76M
Solids, Percent	81.6		%	1	06/19/19 09:42	RC	SM2540 G 18TH ED MOD
pH	6.93 J		su	1	06/19/19 09:55	MS	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1A	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	06/18/19	06/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	541	1.3	mg/kg	1	06/18/19	06/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	85.0	5.2	mg/kg	1	06/18/19	06/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	06/18/19	06/19/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	153	6.4	mg/kg	1	06/18/19	06/19/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46944

(2) Prep QC Batch: MP15592

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1A	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	534	1.8	mg/kg	1	06/19/19 08:26	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1R	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 83.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	184 J-	9.6	mg/kg	20	06/21/19 17:20	JOO	SW846 3060A/7196A
Redox Potential Vs H2	257		mv	1	06/24/19 19:18	JOO	ASTM D1498-76M
Solids, Percent	83.3		%	1	06/20/19 17:10	BG	SM2540 G 18TH ED MOD
pH	8.69 J		su	1	06/24/19 19:34	JOO	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1RT	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	293	4.9	mg/kg	10	06/28/19 16:55	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1RTU	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	< 0.20	0.20	%	1	07/11/19 11:30	MP	ASTM D3872-86 R
Sulfide Screen ^b	NEGATIVE			1	07/11/19 11:30	MP	SM4500S2 - A 11 R
Total Organic Carbon ^c	10900 J	120	mg/kg	1	07/15/19 13:13	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-MSA Lab Sample ID: JC90062-1AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/17/19 Date Received: 06/17/19 Percent Solids: 81.6
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 12	12	mg/kg	5	06/21/19	06/24/19	ND	SW846 6010D ² SW846 3050B ³
Chromium	2620	5.9	mg/kg	5	06/21/19	06/24/19	ND	SW846 6010D ² SW846 3050B ³
Nickel	234	4.7	mg/kg	1	06/21/19	06/22/19	ND	SW846 6010D ¹ SW846 3050B ³
Thallium ^a	< 5.9	5.9	mg/kg	5	06/21/19	06/24/19	ND	SW846 6010D ² SW846 3050B ³
Vanadium	402	5.9	mg/kg	1	06/21/19	06/22/19	ND	SW846 6010D ¹ SW846 3050B ³

- (1) Instrument QC Batch: MA46965
- (2) Instrument QC Batch: MA46971
- (3) Prep QC Batch: MP15790

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1AR	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	2440	1.8	mg/kg	1	06/20/19 09:40		SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MSA	Date Sampled: 06/17/19
Lab Sample ID: JC90062-1ART	Date Received: 06/17/19
Matrix: SO - Soil	Percent Solids: 81.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.2 UJ-	1.2	mg/kg	5	06/26/19	06/27/19 SN	SW846 6020B ¹	SW846 3050B ²
Thallium	< 0.30	0.30	mg/kg	5	06/26/19	06/27/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46997

(2) Prep QC Batch: MP15948

RL = Reporting Limit

4.2
4

Client / Reporting Information Company Name: Arcadis US Inc Street Address: 10 Friends Lane Ste 100 City: Newtown PA State: PA Zip: 18940 Project Contact: Krista Mastocola E-mail: 610-755-7280 Phone #: 610-755-7280		Project Information Project Name: PPG Jersey City- Site 107 Street: 18 Chapel Ave City: Jersey City NJ State: NJ Project #: NH00770.D003.1A00 Client Purchase Order #: 		PED-EX Tracking # SGS Quote # Bottle Order Control # SGS Job # JC90188			
Requested Analysis Total Chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium		Matrix Codes DW - Drinking Water GW - Ground Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CH - CH LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank					
Collection Sample # Field ID / Point of Collection MEQ/ID / Vial # Date Time Sampled by Oak (O) Corp (C) Matrix # of bottles H2O2 HNO3 H2SO4 HClO4 DI Water MESH ENDORE		LAB USE ONLY D22					
Turn Around Time (Business Days) <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days* <input checked="" type="checkbox"/> 2 Business Days* <input type="checkbox"/> 1 Business Day* <input type="checkbox"/> Other		Approved By (SGS PM): / Date: _____ * Approval needed for 1-3 Business Day TAT		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> DOD-QSMS <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> Commercial "C" <input type="checkbox"/> State Forms <input type="checkbox"/> NJ DKQP <input checked="" type="checkbox"/> EDD Format		Comments / Special Instructions LABEL VERIFICATION	
Relinquished by: 1 Date / Time: 13:15 6/19/14		Received By: 2 Date / Time: 17:11 6/19/14		Relinquished by: 3 Date / Time: 13:15 6/19/14		Received By: 4 Date / Time: 17:11 6/19/14	
Relinquished by: 5 Date / Time:		Received By: 5 Date / Time:		Custody Seal # 03152		<input type="checkbox"/> Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Not intact <input type="checkbox"/> Absent <input type="checkbox"/> Therm. ID:	

5.2
5

CIP 3.4

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-1	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	06/21/19 15:38	JOO	SW846 3060A/7196A
Redox Potential Vs H2	347		mv	1	06/24/19 18:57	JOO	ASTM D1498-76M
Solids, Percent	79.8		%	1	06/20/19 17:10	BG	SM2540 G 18TH ED MOD
pH	7.87 J		su	1	06/24/19 18:57	JOO	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-2	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	06/21/19 15:44	JOO	SW846 3060A/7196A
Redox Potential Vs H2	357		mv	1	06/24/19 18:59	JOO	ASTM D1498-76M
Solids, Percent	82.1		%	1	06/20/19 17:10	BG	SM2540 G 18TH ED MOD
pH	7.49 J		su	1	06/24/19 18:59	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G10A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-3	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	06/21/19 15:44	JOO	SW846 3060A/7196A
Redox Potential Vs H2	339		mv	1	06/24/19 19:00	JOO	ASTM D1498-76M
Solids, Percent	83.5		%	1	06/20/19 17:10	BG	SM2540 G 18TH ED MOD
pH	8.29 J		su	1	06/24/19 19:00	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I21A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-4	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.63 UJ-	0.63	mg/kg	1	06/21/19 15:44	JOO	SW846 3060A/7196A
Redox Potential Vs H2	171		mv	1	06/24/19 19:13	JOO	ASTM D1498-76M
Solids, Percent	63		%	1	06/20/19 17:10	BG	SM2540 G 18TH ED MOD
pH	6.38 J		su	1	06/24/19 19:13	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190619)	Date Sampled: 06/19/19
Lab Sample ID: JC90188-5	Date Received: 06/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/20/19 11:01	EB	SW846 7196A
Redox Potential Vs H2	543		mv	1	06/24/19 16:18	JOO	ASTM D1498-76
pH ^a	4.20		su	1	06/20/19 12:22	DDH	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-1R	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54	0.50	mg/kg	1	06/28/19 15:44	NV	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G11		Date Sampled: 06/19/19
Lab Sample ID: JC90188-1RT		Date Received: 06/19/19
Matrix: SO - Soil		Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.81 J	0.20	%	1	07/11/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	07/11/19 11:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	14800 J	130	mg/kg	1	07/15/19 13:40	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-2R	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.69	0.49	mg/kg	1	06/28/19 15:44	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G10A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-3R	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.87	0.48	mg/kg	1	06/28/19 15:55	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I21A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-4R	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.63	mg/kg	1	06/28/19 15:55	NV	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-1A	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	06/20/19	06/20/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.6	1.2	mg/kg	1	06/20/19	06/20/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	13.8	4.8	mg/kg	1	06/20/19	06/20/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/19	06/20/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	19.7	6.0	mg/kg	1	06/20/19	06/20/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46956

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-1A	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 79.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.6	1.7	mg/kg	1	06/20/19 15:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H11 Lab Sample ID: JC90188-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/19 Date Received: 06/19/19 Percent Solids: 82.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/20/19	06/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	14.3	1.2	mg/kg	1	06/20/19	06/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	16.2	4.7	mg/kg	1	06/20/19	06/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/20/19	06/20/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	22.8	5.9	mg/kg	1	06/20/19	06/20/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA46956

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H11	Date Sampled: 06/19/19
Lab Sample ID: JC90188-2A	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 82.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	14.3	1.7	mg/kg	1	06/20/19 15:48	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G10A Lab Sample ID: JC90188-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/19 Date Received: 06/19/19 Percent Solids: 83.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	19.0	1.1	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.2	4.6	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.3	2.3	mg/kg	2	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.3	5.7	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46956

(2) Prep QC Batch: MP15759

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G10A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-3A	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 83.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	18.6	1.6	mg/kg	1	06/20/19 15:53	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I21A Lab Sample ID: JC90188-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/19 Date Received: 06/19/19 Percent Solids: 63.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.4	1.5	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.4	6.2	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	33.7	7.7	mg/kg	1	06/20/19	06/20/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46956

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I21A	Date Sampled: 06/19/19
Lab Sample ID: JC90188-4A	Date Received: 06/19/19
Matrix: SO - Soil	Percent Solids: 63.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.4	2.1	mg/kg	1	06/20/19 15:59	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190619) Lab Sample ID: JC90188-5A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/19/19 Date Received: 06/19/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/22/19	06/24/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/22/19	06/24/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/22/19	06/24/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/22/19	06/24/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/22/19	06/24/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46969

(2) Prep QC Batch: MP15841

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20190619)	Date Sampled: 06/19/19
Lab Sample ID: JC90188-5A	Date Received: 06/19/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/24/19 07:58	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Arccadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SD - Soil SL - Sludge SED - Sediment CR - CR LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Avenue																	
City: Newton PA 18940		City: Jersey City NJ																	
Project Contact: Rash Mathema		Billing Information (if different from Report to): Company Name: Street Address: City: State: Zip:																	
Phone #: 610 455 7080		Project #: NP0002720.0003.1A000																	
Sample(s) Name(s): Chrisha P. Feltri col. 107		Client Purchase Order #:																	
Phone #:		Project Manager: Jim McLaughlin																	
Attention:		Collection:																	
Turn Around Time (Business Days):		Deliverable:										Comments / Special Instructions:							
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other All data available via Lablink		Approved By (SGS PM): / Date: INITIAL ASSESSMENT AP 3-A LABEL VERIFICATION										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format Egn							<input type="checkbox"/> DOD-QSMS
Requisitioned by: [Signature] Date / Time: 6/20/19 1200		Received By: [Signature] Date / Time: 7/1/19										Requisitioned by: [Signature] Date / Time: 6/20/19 1400							Received By: [Signature] Date / Time: 7/1/19
Requisitioned by: Date / Time:		Received By: Date / Time:										Requisitioned by: Date / Time:							Received By: Date / Time:
Requisitioned by: Date / Time:		Received By: Date / Time:										Requisitioned by: Date / Time:							Received By: Date / Time:
Custody Seal # 05190 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input type="checkbox"/> Absent		Preserved where applicable <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Therm. ID: 03.1 SP																	

Report of Analysis

Client Sample ID: FB(20190620)	Date Sampled: 06/20/19
Lab Sample ID: JC90225-1	Date Received: 06/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/20/19 17:55	EB	SW846 7196A
Redox Potential Vs H2	497		mv	1	06/24/19 16:19	JOO	ASTM D1498-76
pH ^a	6.20		su	1	06/20/19 16:20	JP	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FD005	Date Sampled: 06/20/19
Lab Sample ID: JC90225-2	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 RA	0.63	mg/kg	1	06/28/19 11:02	NV	SW846 3060A/7196A
Redox Potential Vs H2	231		mv	1	06/26/19 17:58	JOO	ASTM D1498-76M
Solids, Percent	63.6		%	1	06/23/19 14:20	BG	SM2540 G 18TH ED MOD
pH	7.24 J		su	1	06/26/19 17:58	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I23	Date Sampled: 06/20/19
Lab Sample ID: JC90225-3	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.65 RA	0.65	mg/kg	1	06/28/19 11:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	163		mv	1	06/26/19 18:05	JOO	ASTM D1498-76M
Solids, Percent	62		%	1	06/23/19 14:20	BG	SM2540 G 18TH ED MOD
pH	7.21 J		su	1	06/26/19 18:05	JOO	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I24	Date Sampled: 06/20/19
Lab Sample ID: JC90225-4	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 64.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 RA	0.63	mg/kg	1	06/28/19 11:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	224		mv	1	06/26/19 18:13	JOO	ASTM D1498-76M
Solids, Percent	64		%	1	06/23/19 14:20	BG	SM2540 G 18TH ED MOD
pH	6.87 J		su	1	06/26/19 18:13	JOO	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I22		Date Sampled: 06/20/19
Lab Sample ID: JC90225-5		Date Received: 06/20/19
Matrix: SO - Soil		Percent Solids: 57.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 RA	0.70	mg/kg	1	06/28/19 11:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	184		mv	1	06/26/19 18:18	JOO	ASTM D1498-76M
Solids, Percent	57.3		%	1	06/23/19 14:20	BG	SM2540 G 18TH ED MOD
pH	7.35 J		su	1	06/26/19 18:18	JOO	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FD-006	Date Sampled: 06/20/19
Lab Sample ID: JC90225-6	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 RA	0.64	mg/kg	1	06/28/19 11:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	172		mv	1	06/26/19 18:22	JOO	ASTM D1498-76M
Solids, Percent	62.7		%	1	06/23/19 14:20	BG	SM2540 G 18TH ED MOD
pH	7.31 J		su	1	06/26/19 18:22	JOO	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: FD005	Date Sampled: 06/20/19
Lab Sample ID: JC90225-2R	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.63 RA	0.63	mg/kg	1	07/02/19 13:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FD005		Date Sampled: 06/20/19
Lab Sample ID: JC90225-2RT		Date Received: 06/20/19
Matrix: SO - Soil		Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.4 J	0.20	%	1	07/11/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	07/11/19 11:30	MP	SM4500S2-A-H R
Total Organic Carbon ^c	49000 J	160	mg/kg	1	07/15/19 14:31	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I23	Date Sampled: 06/20/19
Lab Sample ID: JC90225-3R	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81 RA	0.65	mg/kg	1	07/02/19 13:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I24		Date Sampled: 06/20/19
Lab Sample ID: JC90225-4R		Date Received: 06/20/19
Matrix: SO - Soil		Percent Solids: 64.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88 RA	0.63	mg/kg	1	07/02/19 13:48	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I22	Date Sampled: 06/20/19
Lab Sample ID: JC90225-5R	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 57.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.70 RA	0.70	mg/kg	1	07/02/19 13:48	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FD-006	Date Sampled: 06/20/19
Lab Sample ID: JC90225-6R	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64 RA	0.64	mg/kg	1	07/02/19 13:48	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190620)	Date Sampled: 06/20/19
Lab Sample ID: JC90225-1A	Date Received: 06/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA46965

(2) Prep QC Batch: MP15785

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190620)	Date Sampled: 06/20/19
Lab Sample ID: JC90225-1A	Date Received: 06/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	06/21/19 20:17	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FD005 Lab Sample ID: JC90225-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/20/19 Date Received: 06/20/19 Percent Solids: 63.6
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	24.3	1.5	mg/kg	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	26.7	6.2	mg/kg	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.6	7.7	mg/kg	1	06/21/19	06/21/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46965

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FD005	Date Sampled: 06/20/19
Lab Sample ID: JC90225-2A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 63.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.9	2.1	mg/kg	1	06/21/19 16:20	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-I23	Date Sampled: 06/20/19
Lab Sample ID: JC90225-3A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2	3.2	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.5	1.6	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	26.1	6.5	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	37.3	8.1	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46965

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-I23	Date Sampled: 06/20/19
Lab Sample ID: JC90225-3A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.5	2.3	mg/kg	1	06/21/19 16:26	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-I24	Date Sampled: 06/20/19
Lab Sample ID: JC90225-4A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 64.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	31.2	1.5	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	25.0	6.1	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	47.6	7.6	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46965

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I24	Date Sampled: 06/20/19
Lab Sample ID: JC90225-4A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 64.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.4	2.1	mg/kg	1	06/21/19 16:31	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-I22	
Lab Sample ID: JC90225-5A	Date Sampled: 06/20/19
Matrix: SO - Soil	Date Received: 06/20/19
	Percent Solids: 57.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.4	3.4	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	36.0	1.7	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	27.8	6.8	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.7	1.7	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	49.1	8.6	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA46965

(2) Prep QC Batch: MP15759

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-I22		Date Sampled: 06/20/19
Lab Sample ID: JC90225-5A		Date Received: 06/20/19
Matrix: SO - Soil		Percent Solids: 57.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.6	2.4	mg/kg	1	06/21/19 16:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FD-006 Lab Sample ID: JC90225-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/20/19 Date Received: 06/20/19 Percent Solids: 62.7
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1	3.1	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ³
Chromium	22.3	1.5	mg/kg	1	06/21/19	06/24/19	ND SW846 6010D ²	SW846 3050B ³
Nickel	21.5	6.2	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.5	1.5	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ³
Vanadium	35.3	7.7	mg/kg	1	06/21/19	06/21/19	ND SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA46965
- (2) Instrument QC Batch: MA46971
- (3) Prep QC Batch: MP15759

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FD-006	Date Sampled: 06/20/19
Lab Sample ID: JC90225-6A	Date Received: 06/20/19
Matrix: SO - Soil	Percent Solids: 62.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.1	2.1	mg/kg	1	06/24/19 14:19	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



SO
CB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08840
TEL: 732-329-0200 FAX: 732-329-3489/3480
www.sgs.com/en/ususa

FED-EX Tracking #
SGS Order Control #
SGS Quote #
SGS Job # **JC90846**

Client / Reporting Information			Project Information			Requested Analysis												Matrix Codes					
Company Name: ArCADIS			Project Name: 386 Jersey City Site 102			Total Chromium Trivalent Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank					
Street Address: 10 Friends Lane			Street: 18 Chapel Ave.																				
City: Newton PA 18140			City: Jersey City, NJ																				
Project Contact: Krista Maitracha			Project #: N100770 0103 1A00																				
Phone #: 610.755.7080			Client Purchase Order #:																				
Supplier(s) Name(s): Christa C. G. H. 20124205			Project Manager: Jim McLoughlin																				
SGS Sample #	Field ID / Point of Collection	MECHD Val #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	HEI	MSH	INHS	NSH	MONC	D/Water	MEQIN	ENCORE	LAB USE ONLY						
1	FB(20190628)		6/28/19	1115	CC	G	FO	4									X						
2	BS-F10A		6/28/19	1230	CC	G	SO	1									X						
Turn Around Time (Business Days)			Deliverable			Comments / Special Instructions																	
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other: _____ <small>All data available via Lablink</small>			Approved By (SGS PM) / Date: _____ Approved for 1-3 Business Day TAT			<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP			<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format: EDVII			<input type="checkbox"/> DOD-QSMS Initial Assessment: <u>IA</u> Label Verification: <u>AP</u>											
<small>Sample Custody must be documented below each time samples change possession, including courier delivery.</small>																							
Relinquished by: [Signature]	Date / Time: 6/28/19 1400	Received By: [Signature]	Date / Time: 6/28/19 1400	Relinquished by: [Signature]	Date / Time: 6/28/19 1500	Received By: [Signature]	Date / Time: 6/28/19 1500	Relinquished by: [Signature]	Date / Time: 6/28/19 1500	Received By: [Signature]	Date / Time: 6/28/19 1500	Relinquished by: [Signature]	Date / Time: 6/28/19 1500	Received By: [Signature]	Date / Time: 6/28/19 1500	Relinquished by: [Signature]	Date / Time: 6/28/19 1500						
Custody Seal # 10906	<input type="checkbox"/> Intact	<input type="checkbox"/> Not Intact	Preserved where applicable	<input type="checkbox"/> Absent	<input type="checkbox"/> Therm. ID	Cooler Temp. °C																	

5.2
5

CIP 34

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: FB(20190628)		Date Sampled: 06/28/19
Lab Sample ID: JC90846-1		Date Received: 06/28/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	06/29/19 10:16	JOO	SW846 7196A
Redox Potential Vs H2	304		mv	1	06/29/19 19:41	JOO	ASTM D1498-76
pH ^a	6.08		su	1	06/28/19 17:57	DDH	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F10A	Date Sampled: 06/28/19
Lab Sample ID: JC90846-2	Date Received: 06/28/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.65 J-	0.49	mg/kg	1	07/02/19 11:40	NV	SW846 3060A/7196A
Redox Potential Vs H2	248		mv	1	06/29/19 20:29	JOO	ASTM D1498-76M
Solids, Percent	82.3		%	1	06/30/19 14:20	BG	SM2540 G 18TH ED MOD
pH	9.93		su	1	06/29/19 20:16	JOO	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F10A	Date Sampled: 06/28/19
Lab Sample ID: JC90846-2R	Date Received: 06/28/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50	0.49	mg/kg	1	07/05/19 15:45	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F10A		Date Sampled: 06/28/19
Lab Sample ID: JC90846-2RT		Date Received: 06/28/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.90 J	0.20	%	1	07/11/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	07/11/19 11:30	MP	SM4500S2- A-11
Total Organic Carbon ^c	1370 J	120	mg/kg	1	07/15/19 17:00	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190628) Lab Sample ID: JC90846-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 06/28/19 Date Received: 06/28/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	06/29/19	07/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	06/29/19	07/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	06/29/19	07/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	06/29/19	07/01/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	06/29/19	07/01/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47020

(2) Prep QC Batch: MP16115

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190628)	Date Sampled: 06/28/19
Lab Sample ID: JC90846-1A	Date Received: 06/28/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/01/19 21:58	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F10A	Date Sampled: 06/28/19
Lab Sample ID: JC90846-2A	Date Received: 06/28/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	06/29/19	07/02/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	11.4	1.2	mg/kg	1	06/29/19	07/02/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	12.6	4.9	mg/kg	1	06/29/19	07/02/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	06/29/19	07/02/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.7	6.1	mg/kg	1	06/29/19	07/02/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47020

(2) Prep QC Batch: MP16056

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F10A	Date Sampled: 06/28/19
Lab Sample ID: JC90846-2A	Date Received: 06/28/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.8	1.7	mg/kg	1	07/02/19 05:04	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC94207

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34380R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC94207 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
SW-D13(0.0-0.5)	JC94207-1	Soil	8/30/2019		X	X	X
SW-D13(2.0-2.5)	JC94207-2	Soil	8/30/2019		X	X	X
SW-D13(4.0-4.5)	JC94207-3	Soil	8/30/2019		X	X	X
SW-D13(6.0-6.5)	JC94207-4	Soil	8/30/2019		X	X	X
SW-D13(8.0-8.5)	JC94207-5	Soil	8/30/2019		X	X	X
DUP-30(20190830)	JC94207-6	Soil	8/30/2019	SW-D13(8.0-8.5)	X	X	X
FB(20190903)	JC94207-7	Water	9/3/2019		X	X	X
SW-A39(0.0-0.5)	JC94207-8	Soil	9/3/2019		X	X	X
SW-A39(2.0-2.5)	JC94207-8	Soil	9/3/2019		X	X	X
SW-A39(4.0-4.5)	JC94207-9	Soil	9/3/2019		X	X	X
SW-A39(6.0-6.5)	JC94207-10	Soil	9/3/2019		X	X	X
SW-A39(8.0-8.5)	JC94207-12	Soil	9/3/2019		X	X	X
SW-A39(10.0-10.5)	JC94207-13	Soil	9/3/2019		X	X	X
SW-A39(12.0-12.5)	JC94207-14	Soil	9/3/2019		X	X	X
SW-A39(14.0-14.5)	JC94207-15	Soil	9/3/2019		X	X	X
SW-A39(16.0-16.5)	JC94207-16	Soil	9/3/2019		X	X	X
SW-A38(16.0-16.5)	JC94207-17	Soil	9/3/2019		X	X	X
SW-A38(14.0-14.5)	JC94207-18	Soil	9/3/2019		X	X	X
SW-A38(12.0-12.5)	JC94207-19	Soil	9/3/2019		X	X	X
SW-A38(10.0-10.5)	JC94207-20	Soil	9/3/2019		X	X	X
SW-A38(8.0-8.5)	JC94207-21	Soil	9/3/2019		X	X	X
SW-A38(6.0-6.5)	JC94207-22	Soil	9/3/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.

DATA REVIEW REPORT

3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for samples SW-D13(6.0-6.5) and SW-A39(0.0-0.5) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

DATA REVIEW REPORT

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-A39(16.0-16.5) in association with SW-846 6020B analysis exhibited recoveries within the control limits.

The MS/MSD analysis performed on sample locations SW-D13(6.0-6.5) in association with SW-846 6010C analysis exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-D13(6.0-6.5)	Antimony	61.1%	59.6%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-D13(6.0-6.5) and SW-A39(16.0-16.5). The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D13(8.0-8.5) / DUP-30(20190830)	Chromium	27.6	25.8	6.7%
	Nickel	71.1	46.3	42.2%
	Vanadium	30.1	30.6	1.6%
	Chromium, Trivalent	26.8	24.7	8.2%

Notes

AC = Acceptable

The differences in the results between the parent sample SW-D13(8.0-8.5) and field duplicate sample DUP-30(20190830) were acceptable.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

DATA REVIEW REPORT

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location SW-A39(16.0-16.5) in association with SW-846 6020C analysis exhibited %D within control limits.

The serial dilution performed on sample location SW-D13(6.0-6.5) in association with SW-846 6010D analysis exhibited %D within control limits with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
SW-D13(6.0-6.5)	Chromium	12.3%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch. Note the qualifiers were also applied to the trivalent chromium results since the results were determined by calculation.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-D13(6.0-6.5) and SW-A39(0.0-0.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample locations SW-D13(6.0-6.5) and SW-A39(0.0-0.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-D13(6.0-6.5)	Hexavalent Chromium, Soluble	< 50%	< 50%
SW-A39(0.0-0.5)	Hexavalent Chromium, Soluble	< 50%	50.4%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations SW-D13(6.0-6.5) and SW-A39(0.0-0.5) exhibited recoveries within the control limits.

DATA REVIEW REPORT

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-D13(6.0-6.5) and SW-A39(0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D13(8.0-8.5) / DUP-30(20190830)	Hexavalent Chromium	0.81	1.1	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-D13(8.0-8.5) and field duplicate sample DUP-30(20190830) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-D13(0.0-0.5) SW-D13(2.0-2.5) SW-D13(4.0-4.5) SW-D13(6.0-6.5) SW-D13(8.0-8.5) DUP-30(20190830)	SW846 9045D	Analysis: 6 days	< 24 hours of receipt by laboratory
SW-A39(2.0-2.5) SW-A39(4.0-4.5) SW-A39(6.0-6.5) SW-A39(8.0-8.5) SW-A39(10.0-10.5) SW-A39(12.0-12.5) SW-A39(14.0-14.5) SW-A39(16.0-16.5) SW-A38(16.0-16.5) SW-A38(14.0-14.5) SW-A38(12.0-12.5) SW-A38(10.0-10.5)		Analysis: 2 days	

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
SW-A38(8.0-8.5) SW-A38(6.0-6.5)			
SW-D13(6.0-6.5) SW-A39(0.0-0.5)	ASTM D3872-86	Analysis: 20 days Analysis: 16 days	< 24 hours from collection
SW-D13(6.0-6.5) SW-A39(0.0-0.5)	SM4500S2-A	Analysis: 20 days Analysis: 16 days	7 days from collection
SW-D13(6.0-6.5) SW-A39(0.0-0.5)	Lloyd Kahn	Analysis: 26 days Analysis: 22 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

DATA REVIEW REPORT

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations SW-D13(6.0-6.5), FB(20190903), and SW-A39(0.0-0.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-D13(8.0-8.5) / DUP-30(20190830)	Redox Potential	405	403	0.5%
	pH	7.99	8.00	0.1%

The differences in the results between the parent sample SW-D13(8.0-8.5) and field duplicate sample DUP-30(20190830) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 11, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





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CHAIN OF CUSTODY

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PN

FED-EX Tracking #, Bottle Order Control #, SGS Quote #, SGS Job #

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes

Company Name: Arcadis
Project Name: PPG Jersey City Site 107
Street Address: 10 Friends Lane, 18 Chapel Avenue
City: Newtown PA 18940, Jersey City NJ
Project Contact: Krista Mastrecola
Project #: NP000770.0003.1A000
Phone #: 610-755-7080
Project Manager: C Cifelli 201-264-8065, Jim McLaughlin

Table with columns: Lab Sample #, Field ID / Point of Collection, MEOH/DI Vial #, Date, Time, Sampled by, Matrix, # of bottles, and various analytical parameters like Total Chromium, Trivalent Chromium, Hexavalent Chromium, Antimony, Nickel, Thallium, Vanadium.

Turnaround Time (Business days), Data Deliverable Information, Comments / Special Instructions

Emergency & Rush T/A data available via LabLink
Approved by (SGS Project Manager)/Date:
Commercial "A" (Level 1), Commercial "B" (Level 2), FULLT1 (Level 3+4), NJ Reduced, Commercial "C", NYASP Category A, NYASP Category B, State Forms, EDD Format, Other

Table with columns: Relinquished by Sampler, Date/Time, Received By, Date/Time, Relinquished By, Date/Time, Received By, Date/Time



5.2 5



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FB

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JC94207

PAGE 1 OF 2 E

FED-EX Tracking #
SGS Quote #
Bottle Cap Control # **NR-070119-124**
SGS Job # **JC94207**

Company Name Arceadis		Project Name PPG Jersey City Site 107		Matrix Codes																							
Street Address 10 Friends Lane		Street 18 Chapel Avenue		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																							
City State Zip Newtown PA 18940		City State Jersey City NJ		Billing Information (if different from Report to)																							
Project Contact Krista Mastrocola		Project # NP00770-0003-1A000		Company Name																							
Phone # 610-755-7080		Client Purchase Order #		Street Address																							
Samplers Name(s) C.C. Fell: 201-264-8065		Project Manager Jim McLaughlin		City State Zip																							
Lab Sample #		Field ID / Point of Collection		MEOH/DI Vial #		Date		Time		Sampled by		Matrix		# of bottles		Number of preserved bottles											
																HCl, HNO3, H2SO4, HNO2, HNO, DI Water, MEOH, ENCORE											
																lab chromium, Trivalent chromium, Hexavalent chromium, Antimony, Nickel, Thallium, Vanadium											
																LAB USE ONLY											
																D16, A18, G17											
Turnaround Time (Business days)				Data Deliverable Information								Comments / Special Instructions															
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other				Approved by (SGS Project Manager)/Date:				<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS <input type="checkbox"/> Other				INITIAL ASSESSMENT 3A/MM LABEL VERIFICATION											
Emergency & Rush T/A data available via LabLink				Sample Custody must be documented below each time samples change possession, including courier delivery.								Sample inventory is verified upon receipt in the Laboratory															
Relinquished by Sampler:		Date/Time:		Received By:		Date/Time:		Relinquished By:		Date/Time:		Received By:		Date/Time:		Received By:											
1 C.C. Fell		9/3/19 1218		1 Robert Chambers		9/3/19 1537		2 Robert Chambers		9/3/19 1537		3		4		4											
3				3				4				4				4											
5				5				5				5				5											
								Custody Seal # 09728		<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		Preserved where applicable		<input checked="" type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp. 1.6 33.0c													

5.2
5





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusua

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job #

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Turn Around Time, Deliverable, Sample Custody, and various data tables including sample collection details and analysis results.

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC .xlsx



Report of Analysis

Client Sample ID: SW-D13(0.0-0.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-1	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.45	mg/kg	1	09/06/19 17:16	NV	SW846 3060A/7196A
Redox Potential Vs H2	304		mv	1	09/05/19 11:17	MS	ASTM D1498-76M
Solids, Percent	88		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	8.15 J		su	1	09/05/19 11:17	MS	SW846 9045D

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D13(0.0-0.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-1R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	09/16/19 12:03	NV	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D13(2.0-2.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-2	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63 J-	0.47	mg/kg	1	09/06/19 17:16	NV	SW846 3060A/7196A
Redox Potential Vs H2	441		mv	1	09/05/19 12:30	MS	ASTM D1498-76M
Solids, Percent	85.7		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	8.23 J		su	1	09/05/19 12:30	MS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D13(2.0-2.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-2R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	09/16/19 12:03	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D13(4.0-4.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-3	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 86.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76 J-	0.46	mg/kg	1	09/06/19 17:16	NV	SW846 3060A/7196A
Redox Potential Vs H2	420		mv	1	09/05/19 12:46	MS	ASTM D1498-76M
Solids, Percent	86.7		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	8.02 J		su	1	09/05/19 12:47	MS	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-D13(4.0-4.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-3R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 86.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	09/16/19 12:03	NV	SW846 3066A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-D13(6.0-6.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-4	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.90 J-	0.47	mg/kg	1	09/06/19 17:10	NV	SW846 3060A/7196A
Redox Potential Vs H2	412		mv	1	09/05/19 13:00	MS	ASTM D1498-76M
Solids, Percent	86		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	8.10 J		su	1	09/05/19 13:00	MS	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-D13(6.0-6.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-4R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.47	mg/kg	1	09/16/19 11:59	NV	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-D13(6.0-6.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-4RT	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.78 J	0.20	%	1	09/19/19 12:59	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/19/19 12:59	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	30500 J	120	mg/kg	1	09/25/19 12:40	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-D13(8.0-8.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-5	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81 J-	0.47	mg/kg	1	09/06/19 17:16	NV	SW846 3060A/7196A
Redox Potential Vs H2	405		mv	1	09/05/19 13:07	MS	ASTM D1498-76M
Solids, Percent	85.4		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	7.99 J		su	1	09/05/19 13:07	MS	SW846 9045D

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-D13(8.0-8.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-5R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.61	0.47	mg/kg	1	09/16/19 12:03	NV	SW846 3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: DUP-30(20190830)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-6	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	09/06/19 17:16	NV	SW846 3060A/7196A
Redox Potential Vs H2	403		mv	1	09/05/19 13:19	MS	ASTM D1498-76M
Solids, Percent	85.6		%	1	09/03/19 16:55	BG	SM2540 G 18TH ED MOD
pH	8.00 J		su	1	09/05/19 13:19	MS	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: DUP-30(20190830)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-6R	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68	0.47	mg/kg	1	09/16/19 12:03	NV	SW846 3066A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190903)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-7	Date Received: 09/03/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/03/19 21:23	EB	SW846 7196A
Redox Potential Vs H2	350		mv	1	09/04/19 17:10	MS	ASTM D1498-76
pH ^a	5.69		su	1	09/03/19 15:58	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(0.0-0.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-8	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 93.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.43	mg/kg	1	09/06/19 17:10	NV	SW846 3060A/7196A
Redox Potential Vs H2	386		mv	1	09/05/19 13:23	MS	ASTM D1498-76M
Solids, Percent	93.9		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.59 J		su	1	09/05/19 13:23	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(0.0-0.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-8R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 93.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.43	mg/kg	1	09/16/19 13:48	NV	SW846 3066A/7196A

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A39(0.0-0.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-8RT		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 93.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.79 J	0.20	%	1	09/19/19 12:59	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/19/19 12:59	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	21100 J	110	mg/kg	1	09/25/19 13:27	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A39(2.0-2.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-9	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	396		mv	1	09/05/19 13:24	MS	ASTM D1498-76M
Solids, Percent	87		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.01 J		su	1	09/05/19 13:24	MS	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A39(2.0-2.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-9R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.46	mg/kg	1	09/16/19 13:52	NV	SW846 3060A/7196A

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-A39(4.0-4.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-10	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.45	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	309		mv	1	09/05/19 11:22	MS	ASTM D1498-76M
Solids, Percent	88.9		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.05 J		su	1	09/05/19 11:23	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(4.0-4.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-10R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.45	mg/kg	1	09/16/19 13:52	NV	SW846 3060A/7196A

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-11	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.45	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	317		mv	1	09/05/19 11:33	MS	ASTM D1498-76M
Solids, Percent	88		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.06 J		su	1	09/05/19 11:33	MS	SW846 9045D

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-11R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.45	mg/kg	1	09/16/19 13:52	NV	SW846 3060A/7196A

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-A39(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-12	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	09/05/19 11:35	MS	ASTM D1498-76M
Solids, Percent	82.8		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.37 J		su	1	09/05/19 11:35	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-12R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.62	0.48	mg/kg	1	09/16/19 13:52	NV	SW846 3060A/7196A

RL = Reporting Limit

4.25
4

Report of Analysis

Client Sample ID: SW-A39(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-13	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.65 J-	0.45	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	327		mv	1	09/05/19 11:38	MS	ASTM D1498-76M
Solids, Percent	89.2		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.09 J		su	1	09/05/19 11:38	MS	SW846 9045D

RL = Reporting Limit

4.26
4

Report of Analysis

Client Sample ID: SW-A39(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-13R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.46	0.45	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

4.27
4

Report of Analysis

Client Sample ID: SW-A39(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-14	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J-	0.46	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	337		mv	1	09/05/19 11:42	MS	ASTM D1498-76M
Solids, Percent	87.9		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	7.93 J		su	1	09/05/19 11:42	MS	SW846 9045D

RL = Reporting Limit

4.28
4

Report of Analysis

Client Sample ID: SW-A39(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-14R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.71	0.46	mg/kg	1	09/16/19 14:35	NV	SW846 3066A/7196A

RL = Reporting Limit

4.29
4

Report of Analysis

Client Sample ID: SW-A39(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-15	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	343		mv	1	09/05/19 11:43	MS	ASTM D1498-76M
Solids, Percent	87.4		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	7.44 J		su	1	09/05/19 11:43	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-15R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.57	0.46	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

4.31
4

Report of Analysis

Client Sample ID: SW-A39(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-16	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.9 J-	0.55	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	356		mv	1	09/05/19 11:48	MS	ASTM D1498-76M
Solids, Percent	72.4		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	5.85 J		su	1	09/05/19 11:48	MS	SW846 9045D

RL = Reporting Limit

4.32
4

Report of Analysis

Client Sample ID: SW-A39(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-16R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.55	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

4.33
4

Report of Analysis

Client Sample ID: SW-A38(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-17	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.50	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	630		mv	1	09/05/19 11:55	MS	ASTM D1498-76M
Solids, Percent	79.7		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	3.27 J		su	1	09/05/19 11:55	MS	SW846 9045D

RL = Reporting Limit

4.34
4

Report of Analysis

Client Sample ID: SW-A38(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-17R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.50	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-18	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ-	0.43	mg/kg	1	09/06/19 17:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	597		mv	1	09/05/19 11:59	MS	ASTM D1498-76M
Solids, Percent	92.7		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	4.79 J		su	1	09/05/19 11:59	MS	SW846 9045D

RL = Reporting Limit

4.36
4

Report of Analysis

Client Sample ID: SW-A38(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-18R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84	0.43	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-19	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83 J-	0.44	mg/kg	1	09/06/19 17:26	NV	SW846 3060A/7196A
Redox Potential Vs H2	502		mv	1	09/05/19 12:12	MS	ASTM D1498-76M
Solids, Percent	90.1		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	7.47 J		su	1	09/05/19 12:12	MS	SW846 9045D

RL = Reporting Limit

4.38
4

Report of Analysis

Client Sample ID: SW-A38(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-19R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

4.39
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-20	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.56 J-	0.43	mg/kg	1	09/06/19 17:26	NV	SW846 3060A/7196A
Redox Potential Vs H2	426		mv	1	09/05/19 12:40	MS	ASTM D1498-76M
Solids, Percent	92.6		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	8.17 J		su	1	09/05/19 12:41	MS	SW846 9045D

RL = Reporting Limit

4.40
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-20R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.80	0.43	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

4.41
4

Report of Analysis

Client Sample ID: SW-A38(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-21	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.43	mg/kg	1	09/06/19 17:26	NV	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	09/05/19 10:43	MS	ASTM D1498-76M
Solids, Percent	92.4		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	7.60 J		su	1	09/05/19 10:43	MS	SW846 9045D

RL = Reporting Limit

4.42
4

Report of Analysis

Client Sample ID: SW-A38(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: IC94207-21R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.0	0.43	mg/kg	1	09/16/19 14:35	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(6.0-6.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-22	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J-	0.44	mg/kg	1	09/06/19 17:26	NV	SW846 3060A/7196A
Redox Potential Vs H2	317		mv	1	09/05/19 10:49	MS	ASTM D1498-76M
Solids, Percent	91		%	1	09/04/19 18:45	BG	SM2540 G 18TH ED MOD
pH	7.89 J		su	1	09/05/19 10:49	MS	SW846 9045D

RL = Reporting Limit

4.44
4

Report of Analysis

Client Sample ID: SW-A38(6.0-6.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-22R	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.44	mg/kg	1	09/16/19 14:35	NV	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D13(0.0-0.5) Lab Sample ID: JC94207-1A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/30/19 Date Received: 08/30/19 Percent Solids: 88.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	28.4 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	30.1	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	44.9	5.8	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D13(0.0-0.5)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-1A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.8 J	1.7	mg/kg	1	09/04/19 18:48	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-D13(2.0-2.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-2A	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	31.2 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	25.6	4.8	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	55.4	6.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D13(2.0-2.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-2A	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.6 J	1.7	mg/kg	1	09/04/19 18:53	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-D13(4.0-4.5) Lab Sample ID: JC94207-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/30/19 Date Received: 08/30/19 Percent Solids: 86.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.3 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	77.7	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.8	5.8	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D13(4.0-4.5)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-3A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 86.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.5 J	1.7	mg/kg	1	09/04/19 18:58	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-D13(6.0-6.5)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-4A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.8 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	45.4	4.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.0	5.9	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D13(6.0-6.5)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-4A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 86.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.9 J	1.7	mg/kg	1	09/04/19 18:37	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-D13(8.0-8.5)	Date Sampled: 08/30/19
Lab Sample ID: JC94207-5A	Date Received: 08/30/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	27.6 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	71.1	4.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.1	5.9	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-D13(8.0-8.5)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-5A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.8 J	1.7	mg/kg	1	09/04/19 20:42	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-30(20190830)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-6A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.8 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	46.3	4.9	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.6	6.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-30(20190830)		Date Sampled: 08/30/19
Lab Sample ID: JC94207-6A		Date Received: 08/30/19
Matrix: SO - Soil		Percent Solids: 85.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.7 J	1.7	mg/kg	1	09/04/19 20:48	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190903)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-7A		Date Received: 09/03/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47391

(2) Prep QC Batch: MP17139

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: FB(20190903)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-7A		Date Received: 09/03/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/04/19 16:07	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A39(0.0-0.5) Lab Sample ID: JC94207-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 93.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Chromium	14.2 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	18.7	4.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.2	2.2	mg/kg	2	09/04/19	09/05/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	41.3	5.5	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47390
- (2) Instrument QC Batch: MA47399
- (3) Prep QC Batch: MP17137

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A39(0.0-0.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-8A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 93.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.0 J	1.5	mg/kg	1	09/04/19 20:53	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(2.0-2.5) Lab Sample ID: JC94207-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 87.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 JJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	34.7 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	32.2	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	72.9	5.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A39(2.0-2.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-9A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.3 J	1.6	mg/kg	1	09/04/19 20:58	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A39(4.0-4.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-10A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	71.7 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	25.2	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	46.8	5.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(4.0-4.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-10A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 88.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	71.1 J	1.6	mg/kg	1	09/04/19 21:04	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5) Lab Sample ID: JC94207-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 88.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	37.0 J	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	18.7	4.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.5	5.9	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-11A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 88.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	35.8 J	1.7	mg/kg	1	09/04/19 21:09	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-12A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.2 J	1.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	49.7	5.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.1	6.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A39(8.0-8.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-12A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.8 J	1.8	mg/kg	1	09/04/19 21:14	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(10.0-10.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-13A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	56.4 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	30.4	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	29.8	5.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-13A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.13
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	55.8 J	1.6	mg/kg	1	09/04/19 21:19	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(12.0-12.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-14A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.3 J-	2.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	31.5 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	114	4.5	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.9	5.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A39(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-14A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.7 J	1.6	mg/kg	1	09/04/19 21:25	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A39(14.0-14.5) Lab Sample ID: JC94207-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 87.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	26.6 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	119	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	5.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-15A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.6 J	1.6	mg/kg	1	09/04/19 21:40	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(16.0-16.5) Lab Sample ID: JC94207-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 72.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Chromium	19.9 J	1.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	175	5.8	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 7.2	7.2	mg/kg	5	09/04/19	09/05/19 EAL	SW846 6010D ²	SW846 3050B ³
Vanadium	30.8	7.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47390
- (2) Instrument QC Batch: MA47396
- (3) Prep QC Batch: MP17137

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A39(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-16A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.0 J	2.0	mg/kg	1	09/04/19 21:45	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-16AR	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 72.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	< 0.36	0.36	mg/kg	5	09/10/19	09/11/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47431

(2) Prep QC Batch: MP17229

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(16.0-16.5) Lab Sample ID: JC94207-17A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 79.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.4 J	1.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	68.4	5.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.0	6.5	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A38(16.0-16.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-17A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 79.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.7 J	1.8	mg/kg	1	09/04/19 21:50	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A38(14.0-14.5) Lab Sample ID: JC94207-18A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 92.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.2 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	26.5	4.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.0	5.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-A38(14.0-14.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-18A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.8 J	1.5	mg/kg	1	09/04/19 21:55	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-A38(12.0-12.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-19A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.8 J	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	33.7	4.6	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.8	5.7	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-A38(12.0-12.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-19A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 90.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.0 J	1.5	mg/kg	1	09/04/19 22:01	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-20A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	31.8 J	1.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	24.2	4.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.2	5.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-20A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 92.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.21
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	31.2 J	1.4	mg/kg	1	09/04/19 22:06	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-21A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.2 J	1.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	26.9	4.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.8	5.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17137

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(8.0-8.5)	Date Sampled: 09/03/19
Lab Sample ID: JC94207-21A	Date Received: 09/03/19
Matrix: SO - Soil	Percent Solids: 92.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.22
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1 J	1.4	mg/kg	1	09/04/19 22:11	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(6.0-6.5) Lab Sample ID: JC94207-22A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/03/19 Date Received: 09/03/19 Percent Solids: 91.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	30.5	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	35.1	4.4	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	40.4	5.5	mg/kg	1	09/04/19	09/04/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47390

(2) Prep QC Batch: MP17138

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-A38(6.0-6.5)		Date Sampled: 09/03/19
Lab Sample ID: JC94207-22A		Date Received: 09/03/19
Matrix: SO - Soil		Percent Solids: 91.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	29.6	1.5	mg/kg	1	09/04/19 22:42	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.23
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC94360

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34381R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC94360 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20190904)	JC94360-1	Water	9/4/2019		X	X	X
SW-A38(0.0-0.5)	JC94360-2	Soil	9/4/2019		X	X	X
SW-A38(2.0-2.5)	JC94360-3	Soil	9/4/2019		X	X	X
SW-A38(4.0-4.5)	JC94360-4	Soil	9/4/2019		X	X	X
SW-A37(15.0-15.5)	JC94360-5	Soil	9/4/2019		X	X	X
SW-A37(14.0-14.5)	JC94360-6	Soil	9/4/2019		X	X	X
SW-A37(12.0-12.5)	JC94360-7	Soil	9/4/2019		X	X	X
SW-A37(10.0-10.5)	JC94360-8	Soil	9/4/2019		X	X	X
SW-A37(8.0-8.5)	JC94360-9	Soil	9/4/2019		X	X	X
SW-A37(6.0-6.5)	JC94360-10	Soil	9/4/2019		X	X	X
SW-A37(4.0-4.5)	JC94360-11	Soil	9/4/2019		X	X	X
SW-A37(2.0-2.5)	JC94360-12	Soil	9/4/2019		X	X	X
SW-A40(16.0-16.5)	JC94360-13	Soil	9/4/2019		X	X	X
SW-A40(14.0-14.5)	JC94360-14	Soil	9/4/2019		X	X	X
SW-A40(12.0-12.5)	JC94360-15	Soil	9/4/2019		X	X	X
SW-A40(10.0-10.5)	JC94360-16	Soil	9/4/2019		X	X	X
SW-A40(8.0-8.5)	JC94360-17	Soil	9/4/2019		X	X	X
SW-A40(6.0-6.5)	JC94360-18	Soil	9/4/2019		X	X	X
SW-A40(4.0-4.5)	JC94360-19	Soil	9/4/2019		X	X	X
SW-A40(2.0-2.5)	JC94360-20	Soil	9/4/2019		X	X	X
SW-A40(0.0-0.5)	JC94360-21	Soil	9/4/2019		X	X	X
DUP-31(20190904)	JC94360-22	Soil	9/4/2019	SW-A38(4.0-4.5)	X	X	X
DUP-32(20190904)	JC94360-23	Soil	9/4/2019	SW-A40(14.0-14.5)	X	X	X
BS-F25	JC94360-24	Soil	9/4/2019		X	X	X
SW-A37(0.0-0.5)	JC94360-25	Soil	9/4/2019		X	X	X

DATA REVIEW REPORT

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for samples SW-A37(12.0-12.5) and SW-A40(14.0-14.5) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample locations SW-A38(2.0-2.5) and SW-A40(14.0-14.5) exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A38(2.0-2.5)	Antimony	67.5%	64.7%
SW-A40(14.0-14.5)	Antimony	59.7%	64.5%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-A38(2.0-2.5) and SW-A40(14.0-14.5). The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A38(4.0-4.5) / DUP-31(20190904)	Chromium	47.1	23.3	67.6%
	Nickel	20.4	19.5	AC
	Vanadium	34.6	31.9	8.1%
	Chromium, Trivalent	46.6	22.1	71.3%
SW-A40(14.0-14.5) / DUP-32(20190904)	Chromium	27.2	24.8	9.2%
	Nickel	55.3	47.8	14.5%
	Vanadium	26.6	25.9	AC
	Chromium, Trivalent	26.8	24.4	9.4%

Notes

AC = Acceptable

The chromium and trivalent chromium results for samples SW-A38(4.0-4.5) and DUP-31(20190904) exhibited an RPD greater than the acceptance limit. The associated results for chromium and trivalent chromium were qualified as estimated.

The differences in the results between the parent sample SW-A40(14.0-14.5) and field duplicate sample DUP-32(20190904) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

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The serial dilution performed on sample location SW-A38(2.0-2.5) exhibited %D within control limits.

The serial dilution performed on sample location SW-A40(14.0-14.5) exhibited %D within control limits with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
SW-A40(14.0-14.5)	Chromium	10.3%
	Vanadium	10.3%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below. The qualifications are applied to all sample results associated with the sample preparation batch. Note the qualifiers were also applied to the trivalent chromium results since the results were determined by calculation.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-A38(2.0-2.5) and SW-A40(14.0-14.5) in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample locations SW-A38(2.0-2.5) and SW-A40(14.0-14.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A38(2.0-2.5)	Hexavalent Chromium, Soluble	70.4%	< 50%
SW-A40(14.0-14.5)	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations SW-A38(2.0-2.5) and SW-A40(14.0-14.5) exhibited recoveries within the control limits.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample locations SW-A38(2.0-2.5) and SW-A40(14.0-14.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A38(4.0-4.5) / DUP-31(20190904)	Hexavalent Chromium	0.49	1.2	AC
SW-A40(14.0-14.5) / DUP-32(20190904)	Hexavalent Chromium	0.48 U	0.48 U	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample SW-A38(4.0-4.5) and field duplicate sample DUP-31(20190904) was acceptable.

The difference in the hexavalent chromium results between the parent sample SW-A40(14.0-14.5) and field duplicate sample DUP-32(20190904) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
FB(20190904)	SM4500H+B	Analysis: 4 days	< 24 hours of receipt by laboratory
SW-A37(12.0-12.5) SW-A40(14.0-14.5)	ASTM D3872-86	Analysis: 28 days	< 24 hours from collection
SW-A37(12.0-12.5) SW-A40(14.0-14.5)	SM4500S2-A	Analysis: 28 days	7 days from collection
SW-A37(12.0-12.5)	Lloyd Kahn	Analysis: 22 days	14 days from collection
SW-A40(14.0-14.5)		Analysis: 21 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

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2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations FB(20190904), SW-A38(0.0-0.5), SW-A38(2.0-2.5), SW-A37(12.0-12.5), SW-A40(14.0-14.5), and DUP-31(20190904) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A38(4.0-4.5) / DUP-31(20190904)	Redox Potential	365	400	9.2%
	pH	7.72	7.95	2.9%
SW-A40(14.0-14.5) / DUP-32(20190904)	Redox Potential	450	407	10.0%
	pH	7.66	7.93	3.5%

The differences in the results between the parent sample SW-A38(4.0-4.5) and field duplicate sample DUP-31(20190904) were acceptable.

The differences in the results between the parent sample SW-A40(14.0-14.5) and field duplicate sample DUP-32(20190904) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 11, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Client / Reporting Information		Project Information		Requested Analysis										Matrix Codes																										
Company Name: Arcadis		Project Name: PPG Jersey City Site 107		<table border="1"> <tr> <td>Total Chromium</td> <td>Trivalent Chromium</td> <td>Hexavalent Chromium</td> <td>Antimony</td> <td>Nickel</td> <td>Thallium</td> <td>Vanadium</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Total Chromium	Trivalent Chromium	Hexavalent Chromium	Antimony	Nickel	Thallium	Vanadium							X	X	X	X	X	X	X							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total Chromium	Trivalent Chromium	Hexavalent Chromium	Antimony											Nickel	Thallium	Vanadium																								
X	X	X	X	X	X	X																																		
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																																						
City: Newtown PA 18940		City: Jersey City NJ												LAB USE ONLY A28 M21 D55																										
Project Contact: Krista Mastromola		Project #: NP000770.0003.1A000																																						
Phone: 610-755-7080		Client Purchase Order #																																						
Samples / Name(s): C.C. Galli / D. Hlink		Project Manager: Jim McLaughlin																																						
SGS Sample #	Field ID / Point of Collection	MED/VDI Val #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	PCU	NH ₃	H ₂ O ₂	H ₂ SO ₄	None	D. Water	MEDIA	ENCLOSURE																								
1	FB(20190904)		9/4/19	0700	CC	FB	SO	2																																
2	SW-A38(0.0-0.5)		9/4/19	1000	CC	SW	SO	1																																
3	SW-A38(2.0-2.5)		9/4/19	1010	CC	SW	SO	1																																
4	SW-A38(4.0-4.5)		9/4/19	1020	CC	SW	SO	1																																
5	SW-A37(15.0-15.5)		9/4/19	1030	CC	SW	SO	1																																
6	SW-A37(14.0-14.5)		9/4/19	1040	CC	SW	SO	1																																
7	SW-A37(12.0-12.5)		9/4/19	1050	CC	SW	SO	1																																
8	SW-A37(10.0-10.0)		9/4/19	1100	CC	SW	SO	1																																
9	SW-A37(8.0-8.5)		9/4/19	1110	CC	SW	SO	1																																
10	SW-A37(6.0-6.5)		9/4/19	1120	CC	SW	SO	1																																
11	SW-A37(4.0-4.5)		9/4/19	1125	CC	SW	SO	1																																
12	SW-A37(2.0-2.5)		9/4/19	1135	CC	SW	SO	1																																

5.2
5

Turn Around Time (Business Days) Approved By (SGS PM): / Date: _____ <input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ <small>All data available via Lablink</small>		Deliverable <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKOP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Form: EQUIS		Comments / Special Instructions INITIAL ASSESSMENT 3B(0) LABEL VERIFICATION _____	
Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only, Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data		http://www.sgs.com/en/terms-and-conditions	
Sample Custody must be documented below each time samples change possession, including courier delivery.					
Relinquished by: [Signature]	Date / Time: 9/4/19 1315	Received By: Robert Chambers	Date / Time: 9/4/19 1810	Relinquished by: Robert Chambers	Date / Time: 9/4/19
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:
Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:
Custody Sign # 03500		Intact <input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Not intact <input type="checkbox"/> Absent <input type="checkbox"/> Therm. ID _____		On Ice <input checked="" type="checkbox"/> Cooler Temp. 3.3°C	

EHS-QAC-0023-02-FORM-Dayton - Standard COC.doc

SGS North America Inc. - Dayton
 2235 Route 130, Dayton, NJ 08810
 TEL: 732-329-0200 FAX: 732-329-3499/3480
 www.sgs.com/ehausa

FED-EX Tracking # _____ Bottle Order Control # _____
 SGS Quote # _____ SGS Job # **JC94360-**

Client / Reporting Information		Project Information				Requested Analysis										Matrix Codes			
Company Name: Arcadis		Project Name: PPG Jersey City Site 107				Total Chromium Invariant Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
Street Address: 10 Friends Lane		Street: 18 Chapel Ave		Billing Information (if different from Report to)															
City: Newton PA 18940		City: Jersey City NJ		Company Name															
Project Contact: Insta Mastrocola		Project #: MP00070.003.1A00		Street Address															
Phone #: 610-755-7080		Client Purchase Order #		City		State		Zip											
Sampler(s) Name(s)		Project Manager: Jim McLaughlin		Attention:															
SGS Sample #	Field ID / Point of Collection	MEQ/HDl Vol #	Date	Time	Sampled by	Grab (G), Composite (C)	Matrix	# of bottles	HCl	NH ₄ OH	H ₂ SO ₄	NONE	Dl Water	MESH	ENCODE	LAB USE ONLY			
13	SW-A40 (14.0-14.5)		9/4/19	0950	CP/DH	G	SO	1								X			
14	SW-A40 (14.0-14.5)		9/4/19	0940	CP/DH	G	SO	1								X			
15	SW-A40 (12.0-12.5)		9/4/19	0930	CP/DH	G	SO	1								X			
16	SW-A40 (10.0-10.5)		9/4/19	1210	CP/DH	G	SO	1								X			
17	SW-A40 (8.0-8.5)		9/4/19	1220	CP/DH	G	SO	1								X			
18	SW-A40 (6.0-6.5)		9/4/19	1230	CP/DH	G	SO	1								X			
19	SW-A40 (4.0-4.5)		9/4/19	1240	CP/DH	G	SO	1								X			
20	SW-A40 (2.0-2.5)		9/4/19	1250	CP/DH	G	SO	1								X			
21	SW-A40 (0.0-0.5)		9/4/19	1300	CP/DH	G	SO	1								X			
22	DUP-21(20190904)		9/4/19		CP/DH	G	SO	1								X			
23	DUP-32(20190904)		9/4/19		CP/DH	G	SO	1								X			
14	SW-A40(14.0-14.5) MS		9/4/19	0940	CP/DH	G	SO	1								X			
Turn Around Time (Business Days)		Approved By (SGS PM) / Date:				Deliverable										Comments / Special Instructions			
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____ All data available via Lablink		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKGP				<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQWIS													
Approval needed for 1-3 Business Day TAT		Commercial "A" = Results only; Commercial "B" = Results + QC Summary				Commercial "C" = Results + QC Summary + Partial Raw data										http://www.sgs.com/en/terms-and-conditions			
Sample Custody must be documented below each time samples change possession, including courier delivery.																			
Relinquished by: [Signature]		Date / Time: 9/4/19 1315		Received by: [Signature]		Date / Time: 9/4/19 1810		Received by: [Signature]											
Relinquished by: [Signature]		Date / Time:		Received by: [Signature]		Date / Time:		Received by: [Signature]											
Relinquished by: [Signature]		Date / Time:		Received by: [Signature]		Date / Time:		Received by: [Signature]											
				Custody Relinquished		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact		<input type="checkbox"/> Preserved where applicable <input type="checkbox"/> Absent		Therm. ID		<input checked="" type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp. °C							

5.2
5

EHS-A-QAC-0023-02-FORM-Dayton - Standard COC.docx



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Form containing client/reporting information, project information, requested analysis, and sample collection details. Includes handwritten entries for 'Arcadis', 'Friends Lane', 'Jersey City Site 107', and various sample IDs like 'JW-A40' and 'SW-A38'.

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-1	Date Received: 09/04/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/04/19 23:39	EB	SW846 7196A
Redox Potential Vs H2	316		mv	1	09/05/19 17:05	MS	ASTM D1498-76
pH ^a	6.09 J		su	1	09/08/19 11:14	JOO	SM4500H+ B-11

(a) Field analysis required. Received out of hold time and analyzed by request.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A38(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-2	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.52 J-	0.44	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	361		mv	1	09/05/19 20:45	CM	ASTM D1498-76M
Solids, Percent	91.8		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.91		su	1	09/05/19 20:45	CM	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A38(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-2R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(2.0-2.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-3	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J-	0.44	mg/kg	1	09/06/19 15:45	NV	SW846 3060A/7196A
Redox Potential Vs H2	371		mv	1	09/05/19 20:47	CM	ASTM D1498-76M
Solids, Percent	91.9		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.61		su	1	09/05/19 20:47	CM	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A38(2.0-2.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-3R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.44	mg/kg	1	09/17/19 18:28	NV	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-4	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.49 J-	0.43	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	365		mv	1	09/05/19 20:52	CM	ASTM D1498-76M
Solids, Percent	92.8		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.72		su	1	09/05/19 20:52	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-4R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.43	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(15.0-15.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-5	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68 J-	0.54	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	416		mv	1	09/05/19 20:57	CM	ASTM D1498-76M
Solids, Percent	74.7		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	5.55		su	1	09/05/19 20:57	CM	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A37(15.0-15.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-5R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54	0.54	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A37(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-6	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J-	0.50	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	451		mv	1	09/05/19 20:59	CM	ASTM D1498-76M
Solids, Percent	80.5		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.49		su	1	09/05/19 20:59	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-6R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.70	0.50	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A37(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-7	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74 J-	0.43	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	419		mv	1	09/05/19 21:20	CM	ASTM D1498-76M
Solids, Percent	92.1		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	8.00		su	1	09/05/19 21:20	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-7R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.43	mg/kg	1	09/17/19 18:38	NV	SW846 3066A/7196A

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: SW-A37(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-7RT	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.56 J	0.20	%	1	10/02/19 12:44	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/02/19 12:44	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	46500 J	110	mg/kg	1	09/26/19 14:59	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A37(10.0-10.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-8	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64 J-	0.44	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	393		mv	1	09/05/19 21:31	CM	ASTM D1498-76M
Solids, Percent	91.2		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	8.23		su	1	09/05/19 21:32	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(10.0-10.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-8R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.4	0.44	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-9	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.43	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	398		mv	1	09/05/19 21:45	CM	ASTM D1498-76M
Solids, Percent	93.8		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.95		su	1	09/05/19 21:45	CM	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-9R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.88	0.43	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(6.0-6.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-10	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 88.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.48 J-	0.45	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	389		mv	1	09/05/19 21:53	CM	ASTM D1498-76M
Solids, Percent	88.4		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	8.24		su	1	09/05/19 21:53	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(6.0-6.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-10R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 88.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.45	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-A37(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-11	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.92 J-	0.42	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	09/05/19 22:35	CM	ASTM D1498-76M
Solids, Percent	94.5		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.85		su	1	09/05/19 22:35	CM	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-A37(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-11R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8	0.42	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-12		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	09/06/19 15:56	NV	SW846 3060A/7196A
Redox Potential Vs H2	480		mv	1	09/05/19 22:37	CM	ASTM D1498-76M
Solids, Percent	85.5		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.69		su	1	09/05/19 22:37	CM	SW846 9045D

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-12R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.47	mg/kg	1	09/17/19 18:38	NV	SW846 3060A/7196A

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: SW-A40(16.0-16.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-13	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	09/06/19 15:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	462		mv	1	09/05/19 22:39	CM	ASTM D1498-76M
Solids, Percent	82.3		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.43		su	1	09/05/19 22:39	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(16.0-16.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-13R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49	0.49	mg/kg	1	09/17/19 18:39	NV	SW846 3060A/7196A

RL = Reporting Limit

4.26
4

Report of Analysis

Client Sample ID: SW-A40(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-14	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/07/19 17:51	NV	SW846 3060A/7196A
Redox Potential Vs H2	450		mv	1	09/05/19 22:41	CM	ASTM D1498-76M
Solids, Percent	83		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.66		su	1	09/05/19 22:41	CM	SW846 9045D

RL = Reporting Limit

4.27
4

Report of Analysis

Client Sample ID: SW-A40(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-14R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	09/19/19 19:10	EB	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-15	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.6 J-	0.48	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	439		mv	1	09/05/19 22:47	CM	ASTM D1498-76M
Solids, Percent	82.5		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.94		su	1	09/05/19 22:47	CM	SW846 9045D

RL = Reporting Limit

4.29
4

Report of Analysis

Client Sample ID: SW-A40(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-15R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60	0.48	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.30
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5) Lab Sample ID: JC94360-16 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 87.2
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.84 J-	0.46	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	438		mv	1	09/05/19 22:55	CM	ASTM D1498-76M
Solids, Percent	87.2		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.77		su	1	09/05/19 22:56	CM	SW846 9045D

RL = Reporting Limit

4.31
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-16R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.46	mg/kg	1	09/19/19 19:55	EB	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-17	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0 J-	0.47	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	428		mv	1	09/05/19 23:04	CM	ASTM D1498-76M
Solids, Percent	85.5		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.97		su	1	09/05/19 23:04	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-17R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.47	mg/kg	1	09/19/19 19:55	EB	SW846-3060A/7196A

RL = Reporting Limit

4.34
4

Report of Analysis

Client Sample ID: SW-A40(6.0-6.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-18	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.50 J-	0.42	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	410		mv	1	09/05/19 23:10	CM	ASTM D1498-76M
Solids, Percent	96.1		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	8.23		su	1	09/05/19 23:11	CM	SW846 9045D

RL = Reporting Limit

4.35
4

Report of Analysis

Client Sample ID: SW-A40(6.0-6.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-18R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.42	mg/kg	1	09/19/19 19:55	EB	SW846-3060A/7196A

RL = Reporting Limit

4.36
4

Report of Analysis

Client Sample ID: SW-A40(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-19	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.43	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	414		mv	1	09/05/19 23:17	CM	ASTM D1498-76M
Solids, Percent	92.3		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.94		su	1	09/05/19 23:17	CM	SW846 9045D

RL = Reporting Limit

4.37
4

Report of Analysis

Client Sample ID: SW-A40(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-19R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.43	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-20	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6 J-	0.44	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	416		mv	1	09/05/19 23:20	CM	ASTM D1498-76M
Solids, Percent	90.4		%	1	09/05/19 09:40	RC	SM2540 G 18TH ED MOD
pH	7.78		su	1	09/05/19 23:20	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-20R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.40
4

Report of Analysis

Client Sample ID: SW-A40(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-21	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.42	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	09/05/19 23:28	CM	ASTM D1498-76M
Solids, Percent	95.3		%	1	09/05/19 09:30	RC	SM2540 G 18TH ED MOD
pH	7.80		su	1	09/05/19 23:28	CM	SW846 9045D

RL = Reporting Limit

4.41
4

Report of Analysis

Client Sample ID: SW-A40(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-21R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74	0.42	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.42
4

Report of Analysis

Client Sample ID: DUP-31(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-22	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2 J-	0.43	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	400		mv	1	09/05/19 00:03	CM	ASTM D1498-76M
Solids, Percent	92.5		%	1	09/05/19 09:30	RC	SM2540 G 18TH ED MOD
pH	7.95		su	1	09/05/19 00:03	CM	SW846 9045D

RL = Reporting Limit

4.43
4

Report of Analysis

Client Sample ID: DUP-31(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-22R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.43	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.44
4

Report of Analysis

Client Sample ID: DUP-32(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-23	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	407		mv	1	09/05/19 00:06	CM	ASTM D1498-76M
Solids, Percent	83.4		%	1	09/05/19 09:30	RC	SM2540 G 18TH ED MOD
pH	7.93		su	1	09/05/19 00:06	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-32(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-23R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.46
4

Report of Analysis

Client Sample ID: BS-F25	Date Sampled: 09/04/19
Lab Sample ID: JC94360-24	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.47	mg/kg	1	09/07/19 18:01	NV	SW846 3060A/7196A
Redox Potential Vs H2	403		mv	1	09/05/19 00:11	CM	ASTM D1498-76M
Solids, Percent	85		%	1	09/05/19 09:30	RC	SM2540 G 18TH ED MOD
pH	8.06		su	1	09/05/19 00:11	CM	SW846 9045D

RL = Reporting Limit

4.47
4

Report of Analysis

Client Sample ID: BS-F25	Date Sampled: 09/04/19
Lab Sample ID: JC94360-24R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	09/19/19 19:55	EB	SW846 3060A/7196A

RL = Reporting Limit

4.48
4

Report of Analysis

Client Sample ID: SW-A37(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-25	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89 J-	0.43	mg/kg	1	09/07/19 18:02	NV	SW846 3060A/7196A
Redox Potential Vs H2	195		mv	1	09/05/19 00:17	CM	ASTM D1498-76M
Solids, Percent	93.4		%	1	09/05/19 09:30	RC	SM2540 G 18TH ED MOD
pH	7.79		su	1	09/05/19 00:17	CM	SW846 9045D

RL = Reporting Limit

4.49
4

Report of Analysis

Client Sample ID: SW-A37(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-25R	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43	0.43	mg/kg	1	09/19/19 19:58	EB	SW846 3060A/7196A

RL = Reporting Limit

4.50
4

Report of Analysis

Client Sample ID: SW-A40(14.0-14.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-14RT		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	10/02/19 12:44	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/02/19 12:44	MP	SM4500S2 - A H R
Total Organic Carbon ^c	7560 J	120	mg/kg	1	09/25/19 14:23	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190904)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-1A		Date Received: 09/04/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/05/19 09/07/19	EAL	SW846 6010D ²	SW846 3010A ³
Chromium	< 10	10	ug/l	1	09/05/19 09/06/19	EAL	SW846 6010D ¹	SW846 3010A ³
Nickel	< 10	10	ug/l	1	09/05/19 09/06/19	EAL	SW846 6010D ¹	SW846 3010A ³
Thallium	< 10	10	ug/l	1	09/05/19 09/06/19	EAL	SW846 6010D ¹	SW846 3010A ³
Vanadium	< 50	50	ug/l	1	09/05/19 09/06/19	EAL	SW846 6010D ¹	SW846 3010A ³

(1) Instrument QC Batch: MA47397

(2) Instrument QC Batch: MA47408

(3) Prep QC Batch: MP17148

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-1A	Date Received: 09/04/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/06/19 06:01	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A38(0.0-0.5) Lab Sample ID: JC94360-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 91.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.4 UJ-	4.4	mg/kg	2	09/05/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	22.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	33.6	4.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.2	2.2	mg/kg	2	09/05/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	87.6	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A38(0.0-0.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-2A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 91.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.6	1.5	mg/kg	1	09/05/19 20:51	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A38(2.0-2.5) Lab Sample ID: JC94360-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 91.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.3	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	19.0	4.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.8	5.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(2.0-2.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-3A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 91.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.4	1.5	mg/kg	1	09/05/19 20:42	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-4A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	47.1 J	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	20.4	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.6	5.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-4A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 92.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	46.6 J	1.5	mg/kg	1	09/05/19 20:56	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A37(15.0-15.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-5A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	16.8	1.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	16.2	5.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.2	6.6	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(15.0-15.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-5A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.1	1.8	mg/kg	1	09/05/19 21:00	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A37(14.0-14.5) Lab Sample ID: JC94360-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 80.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	22.7	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	23.7	4.9	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.3	6.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A37(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-6A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.8	1.7	mg/kg	1	09/05/19 21:05	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(12.0-12.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-7A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	21.2	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	19.9	4.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.6	5.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(12.0-12.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-7A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 92.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.5	1.4	mg/kg	1	09/05/19 21:18	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(10.0-10.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-8A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.8	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	28.5	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.4	5.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A37(10.0-10.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-8A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.2	1.5	mg/kg	1	09/05/19 21:23	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5) Lab Sample ID: JC94360-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 93.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	28.0	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	23.5	4.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.8	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-9A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.5	1.5	mg/kg	1	09/05/19 21:28	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(6.0-6.5) Lab Sample ID: JC94360-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 88.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	27.5	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	29.3	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.0	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A37(6.0-6.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-10A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 88.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.0	1.6	mg/kg	1	09/05/19 21:32	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-11A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	25.9	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	21.6	4.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	38.5	5.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(4.0-4.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-11A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	25.0	1.4	mg/kg	1	09/05/19 21:37	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5) Lab Sample ID: JC94360-12A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 85.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	254	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	39.5	4.7	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	56.4	5.8	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-12A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	253	1.7	mg/kg	1	09/05/19 21:41	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(16.0-16.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-13A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	24.1	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	90.0	4.7	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.4	5.8	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(16.0-16.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-13A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 82.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1	1.7	mg/kg	1	09/05/19 21:46	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.13
4

Report of Analysis

Client Sample ID: SW-A40(14.0-14.5) Lab Sample ID: JC94360-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 83.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	27.2 J	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	55.3	4.8	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	26.6 J	6.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17157

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A40(14.0-14.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-14A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.8 J	1.7	mg/kg	1	09/05/19 22:55	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A40(12.0-12.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-15A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	24.9	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	53.5	4.9	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.0	6.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-A40(12.0-12.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-15A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 82.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.3	1.7	mg/kg	1	09/05/19 21:51	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5) Lab Sample ID: JC94360-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 87.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	22.5	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	44.8	4.6	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	5.7	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-16A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 87.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.7	1.6	mg/kg	1	09/05/19 21:55	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-17A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	47.8	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	49.3	4.9	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.4	6.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A40(8.0-8.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-17A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 85.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	45.8	1.7	mg/kg	1	09/05/19 22:00	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A40(6.0-6.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-18A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	16.3	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	19.2	4.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.9	5.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A40(6.0-6.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-18A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 96.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.18
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.8	1.4	mg/kg	1	09/05/19 22:23	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(4.0-4.5) Lab Sample ID: JC94360-19A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 92.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	55.7	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	20.9	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	61.2	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-A40(4.0-4.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-19A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.19
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.4	1.5	mg/kg	1	09/05/19 22:27	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5) Lab Sample ID: JC94360-20A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 90.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	94.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	24.4	4.5	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	41.7	5.6	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-20A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 90.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	91.5	1.5	mg/kg	1	09/05/19 22:32	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-21A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.0 UJ-	4.0	mg/kg	2	09/05/19	09/06/19 GT	SW846 6010D ²	SW846 3050B ³
Chromium	55.5	1.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	30.5	4.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.0	2.0	mg/kg	2	09/05/19	09/06/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	37.8	5.0	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ³

(1) Instrument QC Batch: MA47396

(2) Instrument QC Batch: MA47406

(3) Prep QC Batch: MP17159

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(0.0-0.5)		Date Sampled: 09/04/19
Lab Sample ID: JC94360-21A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 95.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	54.4	1.4	mg/kg	1	09/05/19 22:37	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: DUP-31(20190904) Lab Sample ID: JC94360-22A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/04/19 Date Received: 09/04/19 Percent Solids: 92.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.3 J	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	19.5	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.9	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17159

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: DUP-31(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-22A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 92.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.1 J	1.5	mg/kg	1	09/05/19 22:41	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-32(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-23A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	24.8 J	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	47.8	4.7	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.9 J	5.8	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17157

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-32(20190904)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-23A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 83.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.4 J	1.7	mg/kg	1	09/05/19 23:13	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F25		Date Sampled: 09/04/19
Lab Sample ID: JC94360-24A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	22.5 J	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	36.4	4.9	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	24.2 J	6.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17157

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: BS-F25		Date Sampled: 09/04/19
Lab Sample ID: JC94360-24A		Date Received: 09/04/19
Matrix: SO - Soil		Percent Solids: 85.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.24
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.4 J	1.7	mg/kg	1	09/05/19 23:18	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-25A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	33.2 J	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	27.2	4.3	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	65.8 J	5.4	mg/kg	1	09/05/19	09/05/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47396

(2) Prep QC Batch: MP17157

RL = Reporting Limit

4.25
4

Report of Analysis

Client Sample ID: SW-A37(0.0-0.5)	Date Sampled: 09/04/19
Lab Sample ID: JC94360-25A	Date Received: 09/04/19
Matrix: SO - Soil	Percent Solids: 93.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	32.3 J	1.5	mg/kg	1	09/05/19 23:23	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC94441

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34382R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #JC94441 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20190905)	JC94441-1	Water	9/5/2019		X	X	X
BS-F26	JC94441-2	Soil	9/5/2019		X	X	X
SW-A34(0.0-0.5)	JC94441-3	Soil	9/5/2019		X	X	X
SW-A34(2.0-2.5)	JC94441-4	Soil	9/5/2019		X	X	X
SW-A35(0.0-0.5)	JC94441-5	Soil	9/5/2019		X	X	X
SW-A35(2.0-2.5)	JC94441-6	Soil	9/5/2019		X	X	X
SW-A35(4.0-4.5)	JC94441-7	Soil	9/5/2019		X	X	X
SW-A35(6.0-6.5)	JC94441-8	Soil	9/5/2019		X	X	X
SW-A35(8.0-8.5)	JC94441-9	Soil	9/5/2019		X	X	X
SW-A35(10.0-10.5)	JC94441-10	Soil	9/5/2019		X	X	X
SW-A36(0.0-0.5)	JC94441-11	Soil	9/5/2019		X	X	X
SW-A36(2.0-2.5)	JC94441-12	Soil	9/5/2019		X	X	X
SW-A36(4.0-4.5)	JC94441-13	Soil	9/5/2019		X	X	X
SW-A36(6.0-6.5)	JC94441-14	Soil	9/5/2019		X	X	X
SW-A36(8.0-8.5)	JC94441-15	Soil	9/5/2019		X	X	X
DUP-33(20190905)	JC94441-16	Soil	9/5/2019	SW-A36(12.0-12.5)	X	X	X
SW-A36(10.0-10.5)	JC94441-17	Soil	9/5/2019		X	X	X
SW-A36(12.0-12.5)	JC94441-18	Soil	9/5/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for sample BS-F26 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

DATA REVIEW REPORT

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location BS-F26 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-F26	Antimony	64.7%	67.1%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

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5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-F26. The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A36(12.0-12.5) / DUP-33(20190905)	Chromium	62.8	61.4	2.3%
	Nickel	18.8	20.0	AC
	Vanadium	28.5	37.2	AC
	Chromium, Trivalent	58.5	57.7	1.4%

Notes

AC = Acceptable

The differences in the results between the parent sample SW-A36(12.0-12.5) and field duplicate sample DUP-33(20190905) were acceptable.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location BS-F26 exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

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the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location BS-F26 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample location BS-F26 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-F26	Hexavalent Chromium, Soluble	69.7%	67.2%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but $<$ 75%	Non-detect	UJ-
	Detect	J-
Spike recovery $<$ 50%	Non-detect	R
	Detect	R
Spike recovery $>$ 125%	Non-detect	No Action
Spike recovery $>$ 125% but \leq 150%	Detect	J+
Spike recovery $>$ 150%	Detect	R

Notes:

¹ If recoveries are $<$ 50% or $>$ 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the $<$ 50% or $>$ 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location BS-F26 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied

DATA REVIEW REPORT

when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location BS-F26 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A36(12.0-12.5) / DUP-33(20190905)	Hexavalent Chromium	4.3	3.7	15.0%

The difference in the hexavalent chromium results between the parent sample SW-A36(12.0-12.5) and field duplicate sample DUP-33(20190905) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
BS-F26 SW-A34(0.0-0.5) SW-A34(2.0-2.5) SW-A35(0.0-0.5) SW-A35(2.0-2.5) SW-A35(4.0-4.5) SW-A35(6.0-6.5) SW-A35(8.0-8.5) SW-A35(10.0-10.5) SW-A36(0.0-0.5) SW-A36(2.0-2.5) SW-A36(4.0-4.5) SW-A36(6.0-6.5) SW-A36(8.0-8.5) DUP-33(20190905) SW-A36(10.0-10.5) SW-A36(12.0-12.5)	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
BS-F26	ASTM D3872-86	Analysis: 27 days	< 24 hours from collection

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Sample Locations	Method	Holding Time	Criteria
BS-F26	SM4500S2-A	Analysis: 27 days	7 days from collection
BS-F26	Lloyd Kahn	Analysis: 20 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

DATA REVIEW REPORT

The laboratory duplicate analysis performed on sample locations BS-F26 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A36(12.0-12.5) / DUP-33(20190905)	Redox Potential	360	368	2.2%
	pH	7.63	7.76	1.7%

The differences in the results between the parent sample SW-A36(12.0-12.5) and field duplicate sample DUP-33(20190905) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 11, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
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www.sgs.com/ehsusa

E

Client / Reporting Information		Project Information				Requested Analysis												Matrix Codes						
Company Name: Arcadis		Project Name: PPG Jersey City Site 107				Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Reuse Blank TB - Trip Blank						
Street: 10 Friends Lane		Street: 18 Chapel Ave																						
City: Newtown PA 18940		City: Jersey City NJ																						
Project Contact: Christa Mastrocola		Project #: NP00770.0003.1000																						
Phone #: 610-755-7080		Client Purchase Order #:		City:		State:		Zip:																
Sampler(s) Name(s):		Project Manager: Jim McLaughlin		Attention:																				
SGS Sample #	Field ID / Point of Collection	MEDH/DI Viol #	Date	Time	Sampled By	Seal (C) (Comp (C))	Matrix	# of bottles	HC	PH/PC	PH/CO	N/NO ₃	N/NO ₂	N/NO ₃	N/NO ₂	DI WATER	MECH	ENCODE	LAB USE ONLY					
1	FB(20190905)		9/5/19	0945	CC	G	FB	2											86					
2	RJ-F26		9/5/19	1235	CC	G	SO	1											413					
3	SW-A34(0.0-0.5)		9/5/19	0900	CC	G	SO	1																
4	SW-A34(2.0-2.5)		9/5/19	0920	CC	G	SO	1																
5	SW-A35(0.0-0.5)		9/5/19	1110	CC	G	SO	1																
6	SW-A35(2.0-2.5)		9/5/19	1120	CC	G	SO	1																
7	SW-A35(4.0-4.5)		9/5/19	1130	CC	G	SO	1																
8	SW-A35(6.0-6.5)		9/5/19	1140	CC	G	SO	1																
9	SW-A35(8.0-8.5)		9/5/19	1150	CC	G	SO	1																
10	SW-A35(10.0-10.5)		9/5/19	1200	CC	G	SO	1																
11	SW-A36(0.0-0.5)		9/5/19	1000	CC	G	SO	1																
12	SW-A36(2.0-2.5)		9/5/19	1010	CC	G	SO	1																
Turn Around Time (Business Days)										Deliverable										Comments / Special Instructions				
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 3 Business Days <input type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other <small>All data available via Lablink</small>					Approved By (SGS PM) / Date:					<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format: EQUIS					<input type="checkbox"/> DOD-QSMS INITIAL ASSESSMENT 4B <i>dcw</i> LABEL VERIFICATION				
Approval needed for 1-3 Business Day TAT										Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial raw data										http://www.sgs.com/en/terms-and-conditions				
Sample Custody must be documented below each time samples change possession, including courier delivery.																								
Relinquished by: CC		Date / Time: 9/5/19 1307		Received By: <i>[Signature]</i>		Date / Time: 9/5/19 1601		Relinquished by: <i>[Signature]</i>		Date / Time: 9/5/19 1601		Received By: <i>[Signature]</i>		Date / Time: 9/5/19 1601		Received By: <i>[Signature]</i>		Date / Time: 9/5/19 1601		Received By: <i>[Signature]</i>				
Custody # 10260 <input type="checkbox"/> Intact <input type="checkbox"/> Not intact <input checked="" type="checkbox"/> Preserved when applicable <input type="checkbox"/> Absent Therm. ID: 7-70°F																								

5.2
5

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.docx





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Rounta 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC94441

Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Collection table, Turn Around Time, Deliverable, Chain of Custody table, and other administrative fields.

Handwritten notes: BS-F26 MS, BS-F26 MID

Requested Analysis table with columns for Total chromium, Trivalent chromium, Hexavalent chromium, Arsenic, Nickel, Thallium, Vanadium.

Collection table with columns for Sample #, Field ID / Point of Collection, Date, Time, Matrix, # of bottles, and various test parameters.

Turn Around Time (Business Days) and Deliverable section with checkboxes for various service levels and standards.

Chain of Custody table with columns for Relinquished by, Date / Time, Received by, Date / Time, and other tracking details.



Report of Analysis

Client Sample ID: FB(20190905)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-1	Date Received: 09/05/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/05/19 23:24	EB	SW846 7196A
Redox Potential Vs H2	328		mv	1	09/09/19 14:43	MS	ASTM D1498-76
pH ^a	5.49		su	1	09/04/19 17:20	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F26	Date Sampled: 09/05/19
Lab Sample ID: JC94441-2	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54 J-	0.46	mg/kg	1	09/09/19 15:38	NV	SW846 3060A/7196A
Redox Potential Vs H2	325		mv	1	09/09/19 11:45	MS	ASTM D1498-76M
Solids, Percent	87		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.18 J		su	1	09/09/19 11:45	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F26	Date Sampled: 09/05/19
Lab Sample ID: JC94441-2R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.46	mg/kg	1	09/20/19 22:26	EB	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F26		Date Sampled: 09/05/19
Lab Sample ID: JC94441-2RT		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.77 J	0.20	%	1	10/02/19 12:44	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/02/19 12:44	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	1350 J	110	mg/kg	1	09/25/19 14:56	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A34(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-3	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	7.3 J-	0.42	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	09/09/19 11:46	MS	ASTM D1498-76M
Solids, Percent	94.5		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.63 J		su	1	09/09/19 11:46	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A34(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-3R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.42	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A34(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-4	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.3 J-	0.50	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	330		mv	1	09/09/19 11:48	MS	ASTM D1498-76M
Solids, Percent	80		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.82 J		su	1	09/09/19 11:48	MS	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A34(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-4R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	20.4	0.50	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A35(0.0-0.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-5		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 96.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.4 J-	0.41	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	331		mv	1	09/09/19 11:51	MS	ASTM D1498-76M
Solids, Percent	96.4		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.94 J		su	1	09/09/19 11:51	MS	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A35(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-5R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 96.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.98	0.41	mg/kg	1	09/20/19 22:40	EB	SW846 3066A/7196A

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A35(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-6	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.6 J-	0.42	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	334		mv	1	09/09/19 11:52	MS	ASTM D1498-76M
Solids, Percent	94.7		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.69 J		su	1	09/09/19 11:52	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-6R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	11.8	0.42	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A35(4.0-4.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-7	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.93 J-	0.45	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	336		mv	1	09/09/19 11:55	MS	ASTM D1498-76M
Solids, Percent	89.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.03 J		su	1	09/09/19 11:55	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(4.0-4.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-7R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.6	0.45	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A35(6.0-6.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-8	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 J-	0.42	mg/kg	1	09/09/19 15:46	NV	SW846 3060A/7196A
Redox Potential Vs H2	342		mv	1	09/09/19 11:56	MS	ASTM D1498-76M
Solids, Percent	96		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.31 J		su	1	09/09/19 11:56	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(6.0-6.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-8R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.42	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-9		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59 J-	0.42	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	344		mv	1	09/09/19 11:59	MS	ASTM D1498-76M
Solids, Percent	94.3		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.04 J		su	1	09/09/19 11:59	MS	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-9R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.44	0.42	mg/kg	1	09/20/19 22:40	EB	SW846-3060A/7196A

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A35(10.0-10.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-10	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7 J-	0.43	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	354		mv	1	09/09/19 11:25	MS	ASTM D1498-76M
Solids, Percent	93.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.40 J		su	1	09/09/19 11:25	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(10.0-10.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-10R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9	0.43	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: SW-A36(0.0-0.5) Lab Sample ID: JC94441-11 Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 94.3
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 J-	0.42	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	09/09/19 11:27	MS	ASTM D1498-76M
Solids, Percent	94.3		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.78 J		su	1	09/09/19 11:27	MS	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-A36(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-11R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.42	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-A36(2.0-2.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-12		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.43	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	350		mv	1	09/09/19 11:37	MS	ASTM D1498-76M
Solids, Percent	93.3		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.81 J		su	1	09/09/19 11:37	MS	SW846 9045D

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-A36(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-12R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3	0.43	mg/kg	1	09/20/19 22:40	EB	SW846 3060A/7196A

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: SW-A36(4.0-4.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-13		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	5.3 J-	0.43	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	346		mv	1	09/09/19 11:40	MS	ASTM D1498-76M
Solids, Percent	92.3		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.75 J		su	1	09/09/19 11:40	MS	SW846 9045D

RL = Reporting Limit

4.25
4

Report of Analysis

Client Sample ID: SW-A36(4.0-4.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-13R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.43	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-14	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	347		mv	1	09/09/19 11:42	MS	ASTM D1498-76M
Solids, Percent	95.7		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.74 J		su	1	09/09/19 11:42	MS	SW846 9045D

RL = Reporting Limit

4.27
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-14R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.7	0.42	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

4.28
4

Report of Analysis

Client Sample ID: SW-A36(8.0-8.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-15	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 J-	0.46	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	388		mv	1	09/09/19 16:53	MS	ASTM D1498-76M
Solids, Percent	86.6		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.86 J		su	1	09/09/19 16:53	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(8.0-8.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-15R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.9	0.46	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

4.30
4

Report of Analysis

Client Sample ID: DUP-33(20190905)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-16	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.7 J-	0.48	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	368		mv	1	09/09/19 16:58	MS	ASTM D1498-76M
Solids, Percent	82.7		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.76 J		su	1	09/09/19 16:58	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-33(20190905)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-16R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.0	0.48	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

4.32
4

Report of Analysis

Client Sample ID: SW-A36(10.0-10.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-17	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.43	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	358		mv	1	09/09/19 17:01	MS	ASTM D1498-76M
Solids, Percent	93.7		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.80 J		su	1	09/09/19 17:01	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(10.0-10.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-17R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.43	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

4.34
4

Report of Analysis

Client Sample ID: SW-A36(12.0-12.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-18	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.3 J-	0.49	mg/kg	1	09/09/19 16:35	NV	SW846 3060A/7196A
Redox Potential Vs H2	360		mv	1	09/09/19 17:04	MS	ASTM D1498-76M
Solids, Percent	81.1		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.63 J		su	1	09/09/19 17:04	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(12.0-12.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-18R	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.83	0.49	mg/kg	1	09/20/19 23:10	EB	SW846 3060A/7196A

RL = Reporting Limit

4.36
4

Report of Analysis

Client Sample ID: FB(20190905) Lab Sample ID: JC94441-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/06/19	09/07/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/06/19	09/07/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/06/19	09/07/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/06/19	09/07/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/06/19	09/07/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47409

(2) Prep QC Batch: MP17164

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190905)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-1A	Date Received: 09/05/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/07/19 03:54	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F26		Date Sampled: 09/05/19
Lab Sample ID: JC94441-2A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Chromium	23.3	1.1	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Nickel	61.4	4.6	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Vanadium	22.6	5.7	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F26		Date Sampled: 09/05/19
Lab Sample ID: JC94441-2A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 87.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.8	1.6	mg/kg	1	09/06/19 18:26	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A34(0.0-0.5) Lab Sample ID: JC94441-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 94.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	54.1	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	26.5	4.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	53.0	5.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A34(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-3A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	46.8	1.4	mg/kg	1	09/06/19 18:35	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A34(2.0-2.5) Lab Sample ID: JC94441-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 80.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 7.3 UJ-	7.3	mg/kg	3	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	1250	3.6	mg/kg	3	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	214	4.9	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 3.6	3.6	mg/kg	3	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium ^a	416	18	mg/kg	3	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A34(2.0-2.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-4A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	1250	4.1	mg/kg	1	09/06/19 21:15	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A35(0.0-0.5) Lab Sample ID: JC94441-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 96.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	122	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	38.7	4.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	63.9	5.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A35(0.0-0.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-5A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 96.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	118	1.4	mg/kg	1	09/06/19 18:46	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(2.0-2.5) Lab Sample ID: JC94441-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 94.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	128	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	26.4	4.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.0	5.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A35(2.0-2.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-6A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 94.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	121	1.4	mg/kg	1	09/06/19 18:51	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(4.0-4.5) Lab Sample ID: JC94441-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 89.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.5 UJ-	4.5	mg/kg	2	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Chromium	661	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	106	4.5	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.2	2.2	mg/kg	2	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	187	5.6	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47408
- (2) Instrument QC Batch: MA47415
- (3) Prep QC Batch: MP17170

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A35(4.0-4.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-7A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	660	1.6	mg/kg	1	09/06/19 21:20	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A35(6.0-6.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-8A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	33.1	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	14.7	4.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.4	5.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A35(6.0-6.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-8A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	30.9	1.4	mg/kg	1	09/06/19 20:08	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-9A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	17.6	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	15.4	4.5	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.7	5.6	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-9A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	17.0	1.5	mg/kg	1	09/06/19 20:13	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A35(10.0-10.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-10A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Chromium	53.5	1.1	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Nickel	16.3	4.4	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²
Vanadium	28.1	5.5	mg/kg	1	09/06/19	09/06/19	EAL SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A35(10.0-10.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-10A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	51.8	1.5	mg/kg	1	09/06/19 20:18	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(0.0-0.5) Lab Sample ID: JC94441-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 94.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Chromium	45.8	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	25.1	4.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.1	2.1	mg/kg	2	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	31.1	5.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47408
- (2) Instrument QC Batch: MA47415
- (3) Prep QC Batch: MP17170

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A36(0.0-0.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-11A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 94.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	43.6	1.5	mg/kg	1	09/06/19 20:23	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(2.0-2.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-12A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	44.8	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	35.4	4.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	95.5	5.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A36(2.0-2.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-12A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	43.3	1.5	mg/kg	1	09/06/19 20:28	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(4.0-4.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-13A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	170	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	29.8	4.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	54.9	5.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(4.0-4.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-13A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 92.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	165	1.5	mg/kg	1	09/06/19 20:34	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5) Lab Sample ID: JC94441-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 95.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.1 UJ-	4.1	mg/kg	2	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	65.9	1.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	24.5	4.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 2.0	2.0	mg/kg	2	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.2	5.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-14A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	65.6	1.4	mg/kg	1	09/06/19 20:39	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(8.0-8.5) Lab Sample ID: JC94441-15A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 86.6
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	65.1	1.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	34.3	4.8	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	27.8	6.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: SW-A36(8.0-8.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-15A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 86.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.15
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	63.3	1.7	mg/kg	1	09/06/19 20:54	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-33(20190905) Lab Sample ID: JC94441-16A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 82.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	61.4	1.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	20.0	5.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	37.2	6.3	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47408

(2) Prep QC Batch: MP17170

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: DUP-33(20190905)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-16A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	57.7	1.8	mg/kg	1	09/06/19 20:59	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(10.0-10.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-17A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 4.4 UJ-	4.4	mg/kg	2	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Chromium	69.3	1.1	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Nickel	27.4	4.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium ^a	< 2.2	2.2	mg/kg	2	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Vanadium	48.4	5.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47408
- (2) Instrument QC Batch: MA47415
- (3) Prep QC Batch: MP17170

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A36(10.0-10.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-17A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 93.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.17
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	67.7	1.5	mg/kg	1	09/06/19 21:04	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(12.0-12.5)	Date Sampled: 09/05/19
Lab Sample ID: JC94441-18A	Date Received: 09/05/19
Matrix: SO - Soil	Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Chromium	62.8	1.2	mg/kg	1	09/06/19	09/09/19 GT	SW846 6010D ²	SW846 3050B ³
Nickel	18.8	4.8	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.2	1.2	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³
Vanadium	28.5	6.0	mg/kg	1	09/06/19	09/06/19 EAL	SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47408
- (2) Instrument QC Batch: MA47415
- (3) Prep QC Batch: MP17170

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A36(12.0-12.5)		Date Sampled: 09/05/19
Lab Sample ID: JC94441-18A		Date Received: 09/05/19
Matrix: SO - Soil		Percent Solids: 81.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.18
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	58.5	1.7	mg/kg	1	09/09/19 09:48	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A34(2.0-2.5) Lab Sample ID: JC94441-4AR Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/05/19 Date Received: 09/05/19 Percent Solids: 80.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.3	1.3	mg/kg	5	09/10/19	09/11/19 SN	SW846 6020B ¹	SW846 3050B ³
Thallium	< 0.32	0.32	mg/kg	5	09/10/19	09/11/19 SN	SW846 6020B ¹	SW846 3050B ³
Vanadium	511	13	mg/kg	50	09/10/19	09/12/19 SN	SW846 6020B ²	SW846 3050B ³

- (1) Instrument QC Batch: MA47431
- (2) Instrument QC Batch: MA47439
- (3) Prep QC Batch: MP17229

RL = Reporting Limit

4.1
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG # JC94553

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34383R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC94553 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB (20190906)	JC94553-1	Water	09/06/19		X	X	X
SW-A41 (0.0-0.5)	JC94553-2	Soil	09/06/19		X	X	X
SW-A41 (2.0-2.5)	JC94553-3	Soil	09/06/19		X	X	X
SW-A41 (4.0-4.5)	JC94553-4	Soil	09/06/19		X	X	X
SW-A41 (6.0-6.5)	JC94553-5	Soil	09/06/19		X	X	X
SW-A41 (8.0-8.5)	JC94553-6	Soil	09/06/19		X	X	X
SW-A41 (9.0-9.5)	JC94553-7	Soil	09/06/19		X	X	X
BS-E25	JC94553-8	Soil	09/06/19		X	X	X
DUP-34(20190906)	JC94553-9	Soil	09/06/19	BS-E25	X	X	X
BS-E26	JC94553-10	Soil	09/06/19		X	X	X
BS-D25	JC94553-11	Soil	09/06/19		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for sample BS-D25 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

DATA REVIEW REPORT

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location BS-E25 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BSE-25	Antimony	55.1%	57.2%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

DATA REVIEW REPORT

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-E25. The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E25 – DUP-34 (20190906)	Chromium	22.0	21.3	3.2%
	Nickel	54.7	51.2	6.6%
	Vanadium	21.4	20.9	2.4%
	Trivalent Chromium	21.2	20.9	1.4%

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-E25 and field duplicate sample DUP-34 (20190906) were acceptable.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

DATA REVIEW REPORT

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location BS-E25 exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location BS-D25 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-D25	Hexavalent Chromium, Soluble	<50%	<50%
	Hexavalent Chromium, Insoluble	77.2%	73.3%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location BS-D25 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

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The laboratory duplicate analysis performed on sample location BS-D25 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E25 / DUP-34(20190906)	Hexavalent Chromium	1.3	0.60	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium results between the parent sample BS-E25 and field duplicate sample DUP-34(20190906) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
All field samples	SW846 9045D	Analysis: 5 days	< 24 hours of receipt by laboratory
BS-D25	ASTM D3872-86	Analysis: 26 days	< 24 hours from collection
	SM4500S2-A	Analysis: 26 days	7 days from collection
	Lloyd Kahn	Analysis: 24 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method

DATA REVIEW REPORT

blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate performed on sample SW-A41(0.0-0.5) for redox potential and pH exhibited RPDs within the control limits

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-E25 / DUP-34(20190906)	Redox Potential	316	315	0.3%
	pH	8.27	8.33	0.7%

The differences in the results between the parent sample BS-E25 and field duplicate sample DUP-34(20190906) were acceptable.

DATA REVIEW REPORT

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:



DATE: October 11, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
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E

Form with sections: Client / Reporting Information, Project Information, Requested Analysis, Matrix Codes, Collection table (rows 1-8), Deliverables, and Ratiquested by table.

5.2 5

INITIAL ASSESSMENT 3A
LABEL VERIFICATION

EHS-GAC-0023-02-FORM-Dayton - Standard COC.docx



Report of Analysis

Client Sample ID: FB(20190906)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-1		Date Received: 09/06/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/06/19 23:06	EB	SW846 7196A
Redox Potential Vs H2	292		mv	1	09/12/19 16:20	MS	ASTM D1498-76
pH ^a	5.56		su	1	09/06/19 18:11	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A41(0.0-0.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-2	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	310		mv	1	09/11/19 19:52	MS	ASTM D1498-76M
Solids, Percent	88.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.14 J		su	1	09/11/19 19:52	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A41(0.0-0.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-2R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86 J-	0.45	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A41(2.0-2.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-3	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.64 J-	0.52	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	09/11/19 19:58	MS	ASTM D1498-76M
Solids, Percent	76.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.09 J		su	1	09/11/19 19:58	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A41(2.0-2.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-3R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ-	0.52	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A41(4.0-4.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-4	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.51 J-	0.50	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	330		mv	1	09/11/19 20:01	MS	ASTM D1498-76M
Solids, Percent	80.5		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.52 J		su	1	09/11/19 20:01	MS	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A41(4.0-4.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-4R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A41(6.0-6.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-5		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.48	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	334		mv	1	09/11/19 20:05	MS	ASTM D1498-76M
Solids, Percent	84		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.47 J		su	1	09/11/19 20:05	MS	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A41(6.0-6.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-5R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-6	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	09/11/19 20:07	MS	ASTM D1498-76M
Solids, Percent	81.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.37 J		su	1	09/11/19 20:07	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-6R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.49 UJ-	0.49	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(9.0-9.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-7	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	340		mv	1	09/11/19 20:15	MS	ASTM D1498-76M
Solids, Percent	75.9		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.27 J		su	1	09/11/19 20:15	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(9.0-9.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-7R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.53 UJ-	0.53	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-8	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76 J-	0.46	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	316		mv	1	09/11/19 20:19	MS	ASTM D1498-76M
Solids, Percent	87.4		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.27 J		su	1	09/11/19 20:19	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-8R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.46	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.15
4

Report of Analysis

Client Sample ID: DUP-34(20190906)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-9	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	315		mv	1	09/11/19 20:20	MS	ASTM D1498-76M
Solids, Percent	87.4		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.33 J		su	1	09/11/19 20:20	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-34(20190906)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-9R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.60 J-	0.46	mg/kg	1	09/23/19 17:11	RI	SW846 3060A/7196A

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: BS-E26	Date Sampled: 09/06/19
Lab Sample ID: JC94553-10	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.48	mg/kg	1	09/12/19 12:34	NV	SW846 3060A/7196A
Redox Potential Vs H2	204		mv	1	09/11/19 19:41	MS	ASTM D1498-76M
Solids, Percent	84.2		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	9.11 J		su	1	09/11/19 19:43	MS	SW846 9045D

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: BS-E26	Date Sampled: 09/06/19
Lab Sample ID: JC94553-10R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/23/19 17:11	RL	SW846 3060A/7196A

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: BS-D25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-11	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82 J-	0.47	mg/kg	1	09/12/19 12:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	277		mv	1	09/11/19 19:47	MS	ASTM D1498-76M
Solids, Percent	85.7		%	1	09/08/19 14:10	BG	SM2540 G 18TH ED MOD
pH	8.12 J		su	1	09/11/19 19:47	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-11R	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	09/23/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-11RT	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.98 J	0.20	%	1	10/02/19 12:44	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/02/19 12:44	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	8780 J	120	mg/kg	1	09/30/19 11:00	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: FB(20190906)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-1A		Date Received: 09/06/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0 UJ-	6.0	ug/l	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17190

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190906)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-1A		Date Received: 09/06/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/09/19 14:59	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A41(0.0-0.5) Lab Sample ID: JC94553-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/06/19 Date Received: 09/06/19 Percent Solids: 88.2
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	23.7	1.1	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	41.0	4.4	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	64.1	5.5	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A41(0.0-0.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-2A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 88.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.7	1.6	mg/kg	1	09/09/19 15:41	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A41(2.0-2.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-3A	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	36.3	1.4	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	177	5.5	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.9	6.8	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A41(2.0-2.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-3A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 76.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.3
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	35.7	1.9	mg/kg	1	09/09/19 15:45	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(4.0-4.5) Lab Sample ID: JC94553-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/06/19 Date Received: 09/06/19 Percent Solids: 80.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	34.3	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	134	4.8	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	26.9	6.0	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A41(4.0-4.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-4A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 80.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	33.8	1.7	mg/kg	1	09/09/19 15:50	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A41(6.0-6.5) Lab Sample ID: JC94553-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/06/19 Date Received: 09/06/19 Percent Solids: 84.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	43.7	1.2	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	146	4.8	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	32.2	6.0	mg/kg	1	09/09/19	09/09/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(6.0-6.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-5A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 84.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	42.4	1.7	mg/kg	1	09/09/19 15:55	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5) Lab Sample ID: JC94553-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/06/19 Date Received: 09/06/19 Percent Solids: 81.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ-	2.4	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	35.3	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	130	4.8	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	33.7	6.0	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-6A	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 81.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	35.3	1.7	mg/kg	1	09/09/19 16:00	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(9.0-9.5) Lab Sample ID: JC94553-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/06/19 Date Received: 09/06/19 Percent Solids: 75.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7 UJ-	2.7	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	34.5	1.4	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	117	5.4	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	33.3	6.8	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A41(9.0-9.5)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-7A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 75.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	34.5	1.9	mg/kg	1	09/09/19 16:05	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-E25		Date Sampled: 09/06/19
Lab Sample ID: JC94553-8A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	22.0	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	54.7	4.6	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	21.4	5.8	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-E25		Date Sampled: 09/06/19
Lab Sample ID: JC94553-8A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.2	1.7	mg/kg	1	09/09/19 15:22	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: DUP-34(20190906)		Date Sampled: 09/06/19
Lab Sample ID: JC94553-9A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	21.3	1.1	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	51.2	4.5	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	20.9	5.7	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-34(20190906)	Date Sampled: 09/06/19
Lab Sample ID: JC94553-9A	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 87.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	20.9	1.6	mg/kg	1	09/09/19 16:09	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E26		Date Sampled: 09/06/19
Lab Sample ID: JC94553-10A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	28.9	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	54.2	4.9	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	48.1	6.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: BS-E26		Date Sampled: 09/06/19
Lab Sample ID: JC94553-10A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 84.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.3	1.7	mg/kg	1	09/09/19 16:14	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D25		Date Sampled: 09/06/19
Lab Sample ID: JC94553-11A		Date Received: 09/06/19
Matrix: SO - Soil		Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	28.5	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	61.6	4.7	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	22.3	5.8	mg/kg	1	09/09/19	09/09/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47416

(2) Prep QC Batch: MP17189

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: BS-D25	Date Sampled: 09/06/19
Lab Sample ID: JC94553-11A	Date Received: 09/06/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.7	1.7	mg/kg	1	09/09/19 16:19	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC94699

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34384R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC94699 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC94699	FB(20190910)	JC94699-1	Water	9/10/2019		X	X	X
	SW-A43(4.0-4.5)	JC94699-2	Soil	9/10/2019		X	X	X
	SW-A43(6.0-6.5)	JC94699-3	Soil	9/10/2019		X	X	X
	SW-A43(8.0-8.5)	JC94699-4	Soil	9/10/2019		X	X	X
	SW-A42(9.0-9.5)	JC94699-5	Soil	9/10/2019		X	X	X
	SW-A42(0.0-0.5)	JC94699-6	Soil	9/10/2019		X	X	X
	SW-A42(2.0-2.5)	JC94699-7	Soil	9/10/2019		X	X	X
	SW-A42(4.0-4.5)	JC94699-8	Soil	9/10/2019		X	X	X
	SW-A42(6.0-6.5)	JC94699-9	Soil	9/10/2019		X	X	X
	SW-A42(8.0-8.5)	JC94699-10	Soil	9/10/2019		X	X	X
	DUP-35(20190910)	JC94699-11	Soil	9/10/2019	SW-A42(9.0-9.5)		X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for sample SW-A42(6.0-6.5) also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. All initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

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3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A42(6.0-6.5)	Antimony	61.9%	60.2%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

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matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A42(6.0-6.5). The MS/MSD recoveries exhibited acceptable RPDs.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A42(9.0-9.5)/ DUP-35(20190910)	Chromium	23.9	24.8	3.7%
	Nickel	54.4	51.0	6.4%
	Vanadium	23.1	23.4	AC
	Trivalent Chromium	23.9	24.1	0.8%

Notes:

AC = Acceptable

The calculated RPDs and difference in the results between the parent sample SW-A42(9.0-9.5) and field duplicate sample DUP-35(20190910) were acceptable.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

All serial dilutions were within control limits, with the exception of the analytes presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
SW-A42(6.0-6.5)	Chromium	10.6%

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The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> 10%	Non-detect	UJ
	Detect	J

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X	X		
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

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HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate

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the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-A42(6.0-6.5) exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A42(6.0-6.5)	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	98.4%	69.6%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-A42(6.0-6.5) exhibited recoveries within the control limits.

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that the soil samples are clustered on both sides of the Eh pH phase change line. Therefore, some of the samples are in a reducing environment and don't support the presence of hexavalent chromium, and some of the samples are in an oxidizing environment.

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4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory duplicate analysis performed on sample location SW-A42(6.0-6.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A42(9.0-9.5)/ DUP-35(20190910)	Hexavalent Chromium	2.5	0.67	NC

Notes:

NC = Not compliant

Hexavalent chromium associated with samples locations SW-A42(9.0-9.5) and DUP-35(2019010) exhibited a field duplicate difference greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Lab Duplicate (RPD)		X		X	
Field Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription acceptable		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

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GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A43(4.0-4.5) SW-A43(6.0-6.5) SW-A43(8.0-8.5) SW-A42(9.0-9.5) SW-A42(0.0-0.5) SW-A42(2.0-2.5) SW-A42(4.0-4.5) SW-A42(6.0-6.5) SW-A42(8.0-8.5) DUP-35(20190910)	pH by SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory
SW-A42(6.0-6.5)	Ferrous Iron by ASTM D3872-86	Analysis: 22 days	< 24 hours from collection
	Sulfide Screen by SM4500S2-A	Analysis: 22 days	7 days from collection
	TOC by Lloyd Kahn	Analysis: 20 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

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Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All pH buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis for redox potential, percent solids, and pH performed on sample location SW-A42(6.0-6.5) exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

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sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-A42(9.0-9.5)/ DUP-35(20190910)	Redox Potential	389	416	6.7%
	pH	7.93	7.86	AC

Notes:

AC = Acceptable

The calculated RPD and difference in the results between the parent sample SW-A42(9.0-9.5) and field duplicate sample DUP-35(20190910) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76, ASTM D3872-86, SM4500S2-A, Lloyd Kahn	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method blanks		X		X	
C. Field blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Lab Duplicate (RPD)		X		X	
Field Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription acceptable		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

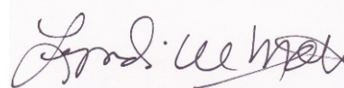
%R Percent recovery

RPD Relative percent difference

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VALIDATION PERFORMED BY: Lyndi Mott

SIGNATURE:

A handwritten signature in black ink, appearing to read "Lyndi Mott", is written over a light gray rectangular background. The signature is cursive and somewhat stylized.

DATE: October 11, 2019

PEER REVIEW: Dennis Capria

DATE: October 11, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Client / Reporting Information		Project Information			Requested Analysis												Matrix Codes
Company Name: Arcadis		Project Name: PPG Jersey City Site 107			Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave.															
City: Newton PA 18940		City: Jersey City NJ															
Project Contact: Krista Masticola		Project #: NP000770.0003.1A000															
Phone #: 610.755.7080		Client Purchase Order #:															
Sampler(s) Name(s): Christina C. Bell		Project Manager: Jim McLoughlin															
SGS Sample #	Field ID / Point of Collection	MEOH/CI Vol #	Date	Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	IC	NIOSH	NIHDS	H-SO	NONE	D Value	MEQH	ENDURE	LAB USE ONLY
1	FB (20190910)		9/10/19	0800	CC	G	FB	2									
	SW-A42(0.0-0.5)		9/10/19		CC	G	SO	1									
	SW-A43(2.0-2.5)		9/10/19		CC	G	SO	1									DS
2	SW-A43(4.0-4.5)		9/10/19	1230	CC	G	SO	1									A32
3	SW-A43(6.0-6.5)		9/10/19	1240	CC	G	SO	1									C36
4	SW-A43(8.0-8.5)		9/10/19	1250	CC	G	SO	1									
5	SW-A42(9.0-9.5)		9/10/19	1200	CC	G	SO	1									
6	SW-A42(0.0-0.5)		9/10/19	1110	CC	G	SO	1									
7	SW-A42(2.0-2.5)		9/10/19	1120	CC	G	SO	1									
8	SW-A42(4.0-4.5)		9/10/19	1130	CC	G	SO	1									
9	SW-A42(6.0-6.5)		9/10/19	1146	CC	G	SO	1									
10	SW-A42(8.0-8.5)		9/10/19	1150	CC	G	SO	1									
Turn Around Time (Business Days)					Deliverable										Comments / Special Instructions		
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other <small>All data available via Lablink</small>					Approved by (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP					<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUILL					INITIAL ASSESSMENT 2B LABEL VERIFICATION _____ http://www.sgs.com/en/terms-and-conditions		
<small>Commercial "A" = Results only; Commercial "B" = Results + QC Summary; Commercial "C" = Results + QC Summary + Partial Raw data</small>																	
<small>Sample Custody must be documented below each time samples change possession, including courier delivery.</small>																	
Relinquished by: Christina C. Bell	Date / Time: 9/10/19 1300	Received By: 1 Robert A. ...	Relinquished by: 2 Robert A. ...	Date / Time: 9-10-19 1705	Received By: 2												
Relinquished by:	Date / Time:	Received By:	Relinquished by:	Date / Time:	Received By:												
Relinquished by:	Date / Time:	Received By:	Custody Seal # 19630	<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Preserved where applicable <input type="checkbox"/> Absent	Therm. ID:											Cooler Temp: 31.0C

5.2
5



CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # JC94699

Client / Reporting Information
Project Information
Requested Analysis
Matrix Codes
Table with columns for Sample #, Field ID, Date, Time, Matrix, and various chemical analysis results (Total Chromium, Trivalent Chromium, etc.)

EHS-A-QAC-0023-02-FORM-Dayton - Standard COC .xlsx

JC94699A: Chain of Custody

Page 2 of 5



5.2
5

Report of Analysis

Client Sample ID: FB(20190910)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-1A		Date Received: 09/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17252

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190910)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-1A		Date Received: 09/10/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/11/19 14:31	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A43(4.0-4.5) Lab Sample ID: JC94699-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 88.3
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	38.9 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	117	4.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.6	5.7	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A43(4.0-4.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-2A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	38.1	J	1.6	mg/kg	1	09/11/19 15:25	EAL SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A43(6.0-6.5) Lab Sample ID: JC94699-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 83.2
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ	2.5	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	52.3 J	1.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	125	5.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.1	6.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A43(6.0-6.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-3A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	52.3 J	1.8	mg/kg	1	09/11/19 15:30	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A43(8.0-8.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-4A	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	45.6 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	143	4.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.2	5.7	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A43(8.0-8.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-4A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	45.2 J	1.6	mg/kg	1	09/11/19 15:35	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A42(9.0-9.5) Lab Sample ID: JC94699-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 85.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.9 J	1.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	54.4	4.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.1	5.8	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A42(9.0-9.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-5A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.9 J	1.7	mg/kg	1	09/11/19 15:50	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(0.0-0.5) Lab Sample ID: JC94699-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 92.0
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ	2.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	27.5 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	36.7	4.5	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	45.7	5.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A42(0.0-0.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-6A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 92.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.1	J	1.5	mg/kg	1	09/11/19 15:55	EAL SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(2.0-2.5) Lab Sample ID: JC94699-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 84.9
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analized By	Method	Prep Method
Antimony	< 2.2 UJ	2.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	75.0 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	84.6	4.5	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	42.5	5.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A42(2.0-2.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-7A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	70.1 J	1.6	mg/kg	1	09/11/19 16:00	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A42(4.0-4.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-8A	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ	2.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	44.0 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	86.9	4.4	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	30.9	5.5	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(4.0-4.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-8A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	41.8 J	1.6	mg/kg	1	09/11/19 16:05	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A42(6.0-6.5) Lab Sample ID: JC94699-9A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 89.0
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analized By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	49.6 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	139	4.5	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.8	5.7	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A42(6.0-6.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-9A	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	47.1 J	1.6	mg/kg	1	09/11/19 15:15	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(8.0-8.5) Lab Sample ID: JC94699-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/10/19 Date Received: 09/10/19 Percent Solids: 88.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ	2.3	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	95.7 J	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	122	4.6	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	33.3	5.7	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A42(8.0-8.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-10A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	95.3 J	1.6	mg/kg	1	09/11/19 16:10	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: DUP-35(20190910)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-11A	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4 UJ	2.4	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	24.8 J	1.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	51.0	4.7	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	23.4	5.9	mg/kg	1	09/11/19	09/11/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47430

(2) Prep QC Batch: MP17251

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: DUP-35(20190910)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-11A		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.1 J	1.7	mg/kg	1	09/11/19 16:15	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190910)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-1	Date Received: 09/10/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/10/19 22:28	EB	SW846 7196A
Redox Potential Vs H2	363		mv	1	09/11/19 12:46	MS	ASTM D1498-76
pH ^a	5.45		su	1	09/10/19 17:21	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A43(4.0-4.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-2	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.81 J-	0.45	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	403		mv	1	09/12/19 10:35	MS	ASTM D1498-76M
Solids, Percent	88.3		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.72 J		su	1	09/12/19 10:35	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A43(4.0-4.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-2R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A43(6.0-6.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-3	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	402		mv	1	09/12/19 10:39	MS	ASTM D1498-76M
Solids, Percent	83.2		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.46 J		su	1	09/12/19 10:39	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A43(6.0-6.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-3R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 83.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A43(8.0-8.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-4	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	396		mv	1	09/12/19 10:41	MS	ASTM D1498-76M
Solids, Percent	83.6		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.98 J		su	1	09/12/19 10:41	MS	SW846 9045D

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A43(8.0-8.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-4R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 83.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	mg/kg	1	09/25/19 14:00	RI	SW846-3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A42(9.0-9.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-5	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	389		mv	1	09/12/19 10:45	MS	ASTM D1498-76M
Solids, Percent	85.3		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.93 J		su	1	09/12/19 10:45	MS	SW846 9045D

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A42(9.0-9.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-5R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 85.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A42(0.0-0.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-6	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 92.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ-	0.43	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	362		mv	1	09/12/19 10:50	MS	ASTM D1498-76M
Solids, Percent	92		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	8.36 J		su	1	09/12/19 10:50	MS	SW846 9045D

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A42(0.0-0.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-6R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 92.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.43	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A42(2.0-2.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-7	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.9 J-	0.47	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	370		mv	1	09/12/19 10:53	MS	ASTM D1498-76M
Solids, Percent	84.9		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.85 J		su	1	09/12/19 10:54	MS	SW846 9045D

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A42(2.0-2.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-7R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.51 J-	0.47	mg/kg	1	09/25/19 14:00	RI	SW846-3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(4.0-4.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-8	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 J-	0.45	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	371		mv	1	09/12/19 10:57	MS	ASTM D1498-76M
Solids, Percent	88.1		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	8.34 J		su	1	09/12/19 10:57	MS	SW846 9045D

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A42(4.0-4.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-8R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(6.0-6.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-9	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.5 J-	0.45	mg/kg	1	09/13/19 13:36	NV	SW846 3060A/7196A
Redox Potential Vs H2	367		mv	1	09/12/19 11:03	MS	ASTM D1498-76M
Solids, Percent	89		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.93 J		su	1	09/12/19 11:03	MS	SW846 9045D

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A42(6.0-6.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-9R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.72 J-	0.45	mg/kg	1	09/25/19 13:54	RI	SW846 3060A/7196A

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A42(6.0-6.5)		Date Sampled: 09/10/19
Lab Sample ID: JC94699-9RT		Date Received: 09/10/19
Matrix: SO - Soil		Percent Solids: 89.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.87 J	0.20	%	1	10/02/19 12:44	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE R			1	10/02/19 12:44	MP	SM4500S2- A-11
Total Organic Carbon ^c	15900 J	110	mg/kg	1	09/30/19 13:14	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.18
4

Report of Analysis

Client Sample ID: SW-A42(8.0-8.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-10	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	442		mv	1	09/12/19 10:19	MS	ASTM D1498-76M
Solids, Percent	88.5		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.58 J		su	1	09/12/19 10:19	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A42(8.0-8.5)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-10R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 88.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.20
4

Report of Analysis

Client Sample ID: DUP-35(20190910)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-11	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.67 J-	0.47	mg/kg	1	09/13/19 13:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	416		mv	1	09/12/19 10:32	MS	ASTM D1498-76M
Solids, Percent	85.4		%	1	09/11/19 16:35	BG	SM2540 G 18TH ED MOD
pH	7.86 J		su	1	09/12/19 10:32	MS	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: DUP-35(20190910)	Date Sampled: 09/10/19
Lab Sample ID: JC94699-11R	Date Received: 09/10/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	09/25/19 14:00	RI	SW846 3060A/7196A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC91019, JC91141, JC91324, JC91782, and JC91973

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34467R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC91019, JC91141, JC91324, JC91782, and JC91973 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC91019	FB(20190702)	JC91019-1	Water	7/2/2019		X	X	X
	BS-G30A	JC91019-2	Soil	7/2/2019		X	X	X
	BS-H12	JC91019-3	Soil	7/2/2019		X	X	X
	BS-G12	JC91019-4	Soil	7/2/2019		X	X	X
	DUP-28(20190702)	JC91019-5	Soil	7/2/2019	BS-G12	X	X	X
JC91141	FB(20190703)	JC91141-1	Water	7/3/2019		X	X	X
	BS-H25A	JC91141-2	Soil	7/3/2019		X	X	X
	BS-H13A	JC91141-3	Soil	7/3/2019		X	X	X
	BS-G13A	JC91141-4	Soil	7/3/2019		X	X	X
JC91324	FB(20190709)	JC91324-1	Water	7/9/2019		X	X	X
	107_F036W	JC91324-2	Soil	7/9/2019		X	X	X
	107_F036E	JC91324-3	Soil	7/9/2019		X	X	X
JC91782	FB(20190717)	JC91782-1	Water	7/17/2019		X	X	X
	BS-E21	JC91782-2	Soil	7/17/2019		X	X	X
JC91973	FB(20190719)	JC91973-1	Water	7/19/2019		X	X	X
	BS-F21	JC91973-2	Soil	7/19/2019		X	X	X
	BS-G21	JC91973-3	Soil	7/19/2019		X	X	X
	BS-G22	JC91973-4	Soil	7/19/2019		X	X	X
	BS-G23	JC91973-5	Soil	7/19/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

4. SDGs #JC91019, JC91324, JC91782, and JC91973: Miscellaneous parameters for samples BS-H12, 107_F036W, BS-E21, and BS-F21 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

RA The result was rejected due to deficiencies but is considered usable for decision-making purposes.

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC91141, JC91782, and JC91973: The MS/MSD analysis was not performed using a sample from these SDGs.

SDGs #JC91019 and JC91324: The MS/MSD analysis performed on sample locations BS-H12 and 107_F036W exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
BS-H12	Antimony	54.5%	55.4%
107_F036W	Antimony	48.4%	48.8%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

DATA REVIEW REPORT

matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC91141, JC91782, and JC91973: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC91019 and JC91324: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples BS-H12 and 107_F036W. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G12 / DUP-28(20190702)	Chromium	16.6	19.1	14.0%
	Trivalent Chromium	16.6	19.1	14.0%
	Vanadium	21.0	22.4	6.5%
	Nickel	16.0	18.8	AC

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-G12 and field duplicate sample DUP-28(20190702) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

DATA REVIEW REPORT

SDGs #JC91141, JC91782, and JC91973: The serial dilution analysis was not performed using a sample from these SDGs.

SDGs #JC91019 and JC91324: The serial dilution performed on sample locations BS-H12 and 107_F036W exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

SDGs #JC91141, JC91324, JC91782, and JC91973: Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

SDG #JC91019: Hexavalent chromium was detected in the associated method blanks; however, the associated sample results were non-detect. No qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

DATA REVIEW REPORT

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC91141: The MS analysis was not performed using a sample from this SDG.

SDGs #JC91019 and JC91973: The MS analysis performed on sample locations BS-H12 and BS-F21 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC91019, JC91324, JC91782, and JC91973: The MS analysis performed on sample locations BS-H12, 107_F036W, BS-E21, and BS-F21 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-H12	Hexavalent Chromium, Soluble	< 50%	< 50%
107_F036W	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		
BS-E21	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble		65.9%
BS-F21	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R/RA
	Detect	R/RA
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC91019 and JC91973: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

DATA REVIEW REPORT

SDG #JC91782: The reanalyses of the field samples are usable with appropriate qualification. No sample results were rejected.

SDG #JC91324: Consistent with practices on the PPG remediation program, since the source sample used for MS analysis exhibited a reducing environment, both detected and non-detected hexavalent chromium results were determined to be rejected but acceptable for use (“RA” qualifier).

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC91141: The PDS analysis was not performed using a sample from this SDG.

SDGs #JC91019, JC91324, JC91782, and JC91973: The PDS analysis performed on sample locations BS-H12, 107_F036W, BS-E21, and BS-F21 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-H12	Hexavalent Chromium	< 85%	< 85%
107_F036W	Hexavalent Chromium	< 85%	< 85%
BS-E21	Hexavalent Chromium	< 85%	< 85%
BS-F21	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

DATA REVIEW REPORT

SDG #JC91141: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC91019, JC91324, JC91782, and JC91973: The laboratory duplicate analysis performed on sample locations BS-H12, 107_F036W, BS-E21, and BS-F21 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G12 / DUP-28(20190702)	Hexavalent Chromium	0.50 U	0.50 U	AC

Notes:

AC = Acceptable

Hexavalent chromium was not detected in the parent sample BS-G12 and field duplicate sample DUP-28(20190702).

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria		
107_F036W 107_F036E	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory		
BS-G30A BS-H12 BS-G12 DUP-28(20190702) BS-F21 BS-G21 BS-G22 BS-G23		Analysis: 3 days			
BS-H25A BS-H13A BS-G13A		Analysis: 5 days			
107_F036W BS-E21		ASTM D3872-86		Analysis: 8 days	< 24 hours from collection
BS-H12				Analysis: 15 days	
BS-F21				Analysis: 27 days	

DATA REVIEW REPORT

Sample Locations	Method	Holding Time	Criteria
107_F036W BS-E21	SM4500S2-A	Analysis: 8 days	7 days from collection
BS-H12		Analysis: 15 days	
BS-F21		Analysis: 27 days	
BS-H12 BS-F21	Lloyd Kahn	Analysis: 15 days	14 days from collection
		Analysis: 27 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

SDGs #JC91019, JC91141, JC91324, and JC91782: Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

SDG #JC91973: TOC was detected in the associated method blank; however, the associated sample result was greater than the BAL. No qualification of the sample result was required.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

DATA REVIEW REPORT

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC91782: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC91019, JC91141, JC91324, and JC91973: The laboratory duplicate analysis performed on sample locations BS-H12, FB(20190703), 107_F036W, and BS-F21 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G12 / DUP-28(20190702)	Redox Potential	245	251	2.4%
	pH	7.65	7.53	1.6%

The differences in the results between the parent sample BS-G12 and field duplicate sample DUP-28(20190702) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 17, 2019

PEER REVIEW: Dennis Capria

DATE: November 5, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB(20190702)	Date Sampled: 07/02/19
Lab Sample ID: JC91019-1	Date Received: 07/02/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/03/19 01:45	EB	SW846 7196A
Redox Potential Vs H2	443		mv	1	07/08/19 14:14	MS	ASTM D1498-76
pH ^a	6.01		su	1	07/02/19 16:50	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G30A	Date Sampled: 07/02/19
Lab Sample ID: JC91019-2	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 66.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.3 J-	0.60	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	07/05/19 22:47	MS	ASTM D1498-76M
Solids, Percent	66.3		%	1	07/03/19 08:40	RC	SM2540 G 18TH ED MOD
pH	6.22 J		su	1	07/05/19 22:47	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-3	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	07/05/19 13:43	NV	SW846 3060A/7196A
Redox Potential Vs H2	371		mv	1	07/05/19 22:49	MS	ASTM D1498-76M
Solids, Percent	80		%	1	07/03/19 08:40	RC	SM2540 G 18TH ED MOD
pH	6.93 J		su	1	07/05/19 22:49	MS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-4	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	245		mv	1	07/05/19 22:50	MS	ASTM D1498-76M
Solids, Percent	80.7		%	1	07/03/19 08:40	RC	SM2540 G 18TH ED MOD
pH	7.65 J		su	1	07/05/19 22:50	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-28(20190702)	Date Sampled: 07/02/19
Lab Sample ID: JC91019-5	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50 UJ-	0.50	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	251		mv	1	07/05/19 22:54	MS	ASTM D1498-76M
Solids, Percent	80		%	1	07/03/19 08:40	RC	SM2540 G 18TH ED MOD
pH	7.53 J		su	1	07/05/19 22:55	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G30A	Date Sampled: 07/02/19
Lab Sample ID: JC91019-2R	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 66.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.60	mg/kg	1	07/09/19 18:25	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-3R	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.96	0.50	mg/kg	1	07/09/19 18:17	NV	SW846 3060A/7196A

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-3RT	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.97 J	0.20	%	1	07/17/19 11:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	07/17/19 11:45	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	12500 J	130	mg/kg	1	07/17/19 16:42	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-4R	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.78	0.50	mg/kg	1	07/09/19 18:25	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-28(20190702)	Date Sampled: 07/02/19
Lab Sample ID: IC91019-5R	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	07/09/19 18:25	NV	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: FB(20190702) Lab Sample ID: JC91019-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/02/19 Date Received: 07/02/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3010A ²

(1) Instrument QC Batch: MA47046

(2) Prep QC Batch: MP16239

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190702)	Date Sampled: 07/02/19
Lab Sample ID: JC91019-1A	Date Received: 07/02/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/05/19 12:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-G30A	Date Sampled: 07/02/19
Lab Sample ID: JC91019-2A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 66.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.9 UJ-	2.9	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	13.8	1.5	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	12.6	5.8	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	21.5	1.5	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA47046

(2) Prep QC Batch: MP16242

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G30A	Date Sampled: 07/02/19
Lab Sample ID: JC91019-2A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 66.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	2.1	mg/kg	1	07/05/19 14:04	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H12 Lab Sample ID: JC91019-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/02/19 Date Received: 07/02/19 Percent Solids: 80.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	07/03/19	07/05/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	15.5	1.3	mg/kg	1	07/03/19	07/05/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	25.4	5.2	mg/kg	1	07/03/19	07/05/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/03/19	07/05/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	26.7	1.3	mg/kg	1	07/03/19	07/05/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47046

(2) Prep QC Batch: MP16242

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-H12		Date Sampled: 07/02/19
Lab Sample ID: JC91019-3A		Date Received: 07/02/19
Matrix: SO - Soil		Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.5	1.8	mg/kg	1	07/05/19 13:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-4A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5 UJ-	2.5	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	16.6	1.3	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	16.0	5.0	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	21.0	1.3	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA47046

(2) Prep QC Batch: MP16242

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G12	Date Sampled: 07/02/19
Lab Sample ID: JC91019-4A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.6	1.8	mg/kg	1	07/05/19 14:09	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-28(20190702)	Date Sampled: 07/02/19
Lab Sample ID: JC91019-5A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6 UJ-	2.6	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	19.1	1.3	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	18.8	5.1	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium ^a	< 2.6	2.6	mg/kg	2	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	22.4	1.3	mg/kg	1	07/03/19	07/05/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA47046

(2) Prep QC Batch: MP16242

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: DUP-28(20190702)	Date Sampled: 07/02/19
Lab Sample ID: JC91019-5A	Date Received: 07/02/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	19.1	1.8	mg/kg	1	07/05/19 14:14	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



50
PB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusua

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC91141

Company Name Arcadis		Project Name PPG Jersey City Site 107		Analysis (see TEST CODE sheet)										Matrix Codes									
Street Address 10 Friends Lane		Street 18 Chapel Avenue		Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank									
City Newtown PA 18940		City Jersey City NJ																					
Project Contact Krista Meskacian		Project # NP000770.0003.1A000																					
Phone # 610.735.7080		Client Purchase Order #																					
Sampler(s) Name(s) Christina C.elli 201-264-8885		Project Manager Jim McLaughlin												LAB USE ONLY									
Lab Sample #	Field ID / Point of Collection	MEQ/ODI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NiOH	HNO3	H2SO4	NONE	DI Water	MEDH	ENCORE	Total Chromium	Trivalent Chromium	Hexavalent Chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY
1	FB(20190703)		7/2/19	0715	CC	FB	4									X	X	X	X	X	X	X	A34
2	BS-H25A		7/3/19	0930	CC	SO	1									X	X	X	X	X	X	X	G27
3	BS-H13A		7/3/19	1115	CC	SO	1									X	X	X	X	X	X	X	D45
4	BS-G13A		7/3/19	1120	CC	SO	1									X	X	X	X	X	X	X	J

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date:		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3/4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format EDU <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting										Initial Assessment SA AP Label Verification _____	
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only; Commercial "B" = Results + QC Summary										Sample inventory is verified upon receipt in the Laboratory			

Sample Custody must be documented below each time samples change possession, including courier delivery.												
1	Relinquished By: Sampler	Date/Time: 7/3/19 1130	Received By: [Signature]	Date/Time: 7/3/19 1150	2	Relinquished By: [Signature]	Date/Time: 7/3/19	Received By: [Signature]	3	Relinquished By: [Signature]	Date/Time: 7/3/19	Received By: [Signature]
3	Relinquished By: Sampler	Date/Time:	Received By:	Date/Time:	4	Relinquished By:	Date/Time:	Received By:	5	Relinquished By:	Date/Time:	Received By:
Custody Seal #					<input type="checkbox"/> Intact Preserved where applicable <input type="checkbox"/> Not intact		On Ice		Cooler Temp.			



5.2
5

CR 33

Report of Analysis

Client Sample ID: FB(20190703)	Date Sampled: 07/03/19
Lab Sample ID: JC91141-1	Date Received: 07/03/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/04/19 01:15	EB	SW846 7196A
Redox Potential Vs H2	445		mv	1	07/08/19 14:11	MS	ASTM D1498-76
pH ^a	5.99		su	1	07/03/19 17:20	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H25A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-2	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	326		mv	1	07/08/19 21:23	MS	ASTM D1498-76M
Solids, Percent	77.5		%	1	07/07/19 12:20	BG	SM2540 G 18TH ED MOD
pH	5.73 J		su	1	07/08/19 21:23	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H13A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-3	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	295		mv	1	07/08/19 21:28	MS	ASTM D1498-76M
Solids, Percent	78.1		%	1	07/07/19 12:20	BG	SM2540 G 18TH ED MOD
pH	7.74 J		su	1	07/08/19 21:28	MS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G13A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-4	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.94	0.54	mg/kg	1	07/05/19 13:57	NV	SW846 3060A/7196A
Redox Potential Vs H2	272		mv	1	07/08/19 21:33	MS	ASTM D1498-76M
Solids, Percent	74.7		%	1	07/07/19 12:20	BG	SM2540 G 18TH ED MOD
pH	7.33 J		su	1	07/08/19 21:34	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190703) Lab Sample ID: JC91141-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/03/19 Date Received: 07/03/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47054

(2) Prep QC Batch: MP16256

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190703)	Date Sampled: 07/03/19
Lab Sample ID: JC91141-1A	Date Received: 07/03/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/09/19 04:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-H25A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-2A	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	4.5	1.3	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	29.0	5.3	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	7.3	6.6	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47055

(2) Prep QC Batch: MP16257

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H25A		Date Sampled: 07/03/19
Lab Sample ID: JC91141-2A		Date Received: 07/03/19
Matrix: SO - Soil		Percent Solids: 77.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	4.0	1.8	mg/kg	1	07/09/19 00:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-H13A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-3A	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.8	1.2	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.9	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.4	6.1	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47055

(2) Prep QC Batch: MP16257

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-H13A	Date Sampled: 07/03/19
Lab Sample ID: JC91141-3A	Date Received: 07/03/19
Matrix: SO - Soil	Percent Solids: 78.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.8	1.7	mg/kg	1	07/09/19 00:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G13A		Date Sampled: 07/03/19
Lab Sample ID: JC91141-4A		Date Received: 07/03/19
Matrix: SO - Soil		Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	14.0	1.4	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	36.2	5.5	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	20.5	6.8	mg/kg	1	07/05/19	07/09/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47055

(2) Prep QC Batch: MP16257

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G13A		Date Sampled: 07/03/19
Lab Sample ID: JC91141-4A		Date Received: 07/03/19
Matrix: SO - Soil		Percent Solids: 74.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.1	1.9	mg/kg	1	07/09/19 00:46	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



FB
50

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusaa

FED-EX Tracking # _____
Bottle Order Control # _____
SGS Quote # _____
SGS Job # **JC91324**

Client / Reporting Information		Project Information										Requested Analysis (see TEST CODE sheet)								Matrix Codes
Company Name Arcadis		Project Name PPG Jersey City Site 107										<div style="display: flex; flex-direction: row-reverse; justify-content: space-between; writing-mode: vertical-rl; transform: rotate(180deg);"> Total chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium </div>								DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address 10 Friends Lane		Street 18 Chapel Avenue																		
City/State/Zip Newtown PA 18940		City/State Jersey City NJ																		
Project Contact Krista Mastrocola		Project # NP000770.0003-1A000																		
Phone # 610-755-7080		Client Purchase Order # NP000770.0003-1A000																		
Sampler(s) Name(s) C Cielli		Project Manager Jim McLaughlin																		
Phone # 201-264-8065		Attention: 207																		
Lab Sample #		Collection																		
Field ID / Point of Collection		MEQH/DI/Vial #																		
Date		Time																		
Sampled by		Matrix																		
# of bottles		Number of preserved bottles																		
TIC		NH ₄ N																		
HNO ₃		HNO ₂																		
HPO ₄		NONE																		
DI/Vials		MEQH																		
ENCLOSURE		ENCLOSURE																		

Lab Sample #	Field ID / Point of Collection	MEQH/DI/Vial #	Date	Time	Sampled by	Matrix	# of bottles	TIC	NH ₄ N	HNO ₃	HNO ₂	HPO ₄	NONE	DI/Vials	MEQH	ENCLOSURE	Total chromium	Trivalent chromium	Hexavalent chromium	Antimony	Nickel	Thallium	Vanadium	
1	FB(2019 0709)		07/09/19	1255	GG	FB	4	2		2							x	x	x	x	x	x	x	
2	107-F036W		07/09/19	1210	GG	SO	1										x	x	x	x	x	x	x	A40
3	107-F036E		07/09/19	1215	GG	SO	1										x	x	x	x	x	x	x	M8 D7

INITIAL ASSESSMENT _____

LABEL VERIFICATION _____

Turnaround Time (Business days) _____

Data Deliverable Information _____

Comments / Special Instructions _____

<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other _____	Approved by (SGS Project Manager)/Date: _____ _____	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQULS <input type="checkbox"/> Other _____
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Emergency & Rush T/A data available via LabLink

Commercial "A" = Results Only; Commercial "B" = Results + QC Summary
 NJ Reduced = Results + QC Summary + Partial Raw data
 Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
1	07/09/19 1300	1 Sch	7/9/19 1300	1 Sch	7/9/19	1545	
3		3		4		4	
5		5		Custody Seal #		Intact	Preserved where applicable

CIP 32



Report of Analysis

Client Sample ID: FB(20190709)	Date Sampled: 07/09/19
Lab Sample ID: JC91324-1	Date Received: 07/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/09/19 23:49	EB	SW846 7196A
Redox Potential Vs H2	192		mv	1	07/10/19 00:03	MS	ASTM D1498-76
pH ^a	5.63		su	1	07/09/19 16:54	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_F036W	Date Sampled: 07/09/19
Lab Sample ID: JC91324-2	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 64.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 RA	0.62	mg/kg	1	07/11/19 15:15	NV	SW846 3060A/7196A
Redox Potential Vs H2	295		mv	1	07/11/19 13:26	MS	ASTM D1498-76M
Solids, Percent	64.2		%	1	07/10/19 08:30	RC	SM2540 G 18TH ED MOD
pH	6.55 J		su	1	07/11/19 15:09	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_F036E	Date Sampled: 07/09/19
Lab Sample ID: JC91324-3	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 RA	0.64	mg/kg	1	07/11/19 15:23	NV	SW846 3060A/7196A
Redox Potential Vs H2	235		mv	1	07/11/19 13:27	MS	ASTM D1498-76M
Solids, Percent	62.8		%	1	07/10/19 08:30	RC	SM2540 G 18TH ED MOD
pH	7.14 J		su	1	07/11/19 15:10	MS	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_F036W	Date Sampled: 07/09/19
Lab Sample ID: JC91324-2R	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 64.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.8 RA	0.62	mg/kg	1	07/15/19 15:12	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: 107_F036W Lab Sample ID: JC91324-2RT Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/09/19 Date Received: 07/09/19 Percent Solids: 64.2
--	--

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	2.3 J	0.20	%	1	07/17/19 11:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	07/17/19 11:45	MP	SM4500S2- A-11
Total Organic Carbon ^c	36800	160	mg/kg	1	07/23/19 12:14	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_F036E	Date Sampled: 07/09/19
Lab Sample ID: JC91324-3R	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.64 RA	0.64	mg/kg	1	07/15/19 15:22	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190709)	Date Sampled: 07/09/19
Lab Sample ID: JC91324-1A	Date Received: 07/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/10/19	07/11/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/10/19	07/11/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/10/19	07/11/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/10/19	07/11/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/10/19	07/11/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47077

(2) Prep QC Batch: MP16323

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190709)	Date Sampled: 07/09/19
Lab Sample ID: JC91324-1A	Date Received: 07/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/11/19 06:51	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: 107_F036W	Date Sampled: 07/09/19
Lab Sample ID: JC91324-2A	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 64.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.1 UJ-	3.1	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	23.9	1.5	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	19.7	6.1	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	33.4	7.6	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA47077

(2) Prep QC Batch: MP16324

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_F036W	Date Sampled: 07/09/19
Lab Sample ID: JC91324-2A	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 64.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.5	2.1	mg/kg	1	07/11/19 04:07	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: 107_F036E	Date Sampled: 07/09/19
Lab Sample ID: JC91324-3A	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.2 UJ-	3.2	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Chromium	22.8	1.6	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Nickel	18.2	6.3	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Thallium	< 1.6	1.6	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²
Vanadium	35.2	7.9	mg/kg	1	07/10/19	07/11/19	ND	SW846 6010D ¹ SW846 3050B ²

(1) Instrument QC Batch: MA47077

(2) Prep QC Batch: MP16324

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: 107_F036E	Date Sampled: 07/09/19
Lab Sample ID: JC91324-3A	Date Received: 07/09/19
Matrix: SO - Soil	Percent Solids: 62.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.3	2.2	mg/kg	1	07/11/19 04:38	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: FB(20190717)	Date Sampled: 07/17/19
Lab Sample ID: JC91782-1	Date Received: 07/17/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/18/19 10:02	JOO	SW846 7196A
Redox Potential Vs H2	300		mv	1	07/18/19 19:36	MS	ASTM D1498-76
pH ^a	5.91		su	1	07/17/19 17:09	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E21	Date Sampled: 07/17/19
Lab Sample ID: JC91782-2	Date Received: 07/17/19
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4	0.56	mg/kg	1	07/19/19 12:17	NV	SW846 3060A/7196A
Redox Potential Vs H2	240		mv	1	07/18/19 21:56	MS	ASTM D1498-76M
Solids, Percent	71.6		%	1	07/18/19 16:45	BG	SM2540 G 18TH ED MOD
pH	7.03		su	1	07/18/19 21:57	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E21	Date Sampled: 07/17/19
Lab Sample ID: JC91782-2R	Date Received: 07/17/19
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.56 UJ-	0.56	mg/kg	1	07/23/19 12:13	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E21	Date Sampled: 07/17/19
Lab Sample ID: JC91782-2RT	Date Received: 07/17/19
Matrix: SO - Soil	Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.2 J	0.20	%	1	07/25/19 11:45	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	07/25/19 11:45	MP	SM4500S2- A-11
Total Organic Carbon	27800	140	mg/kg	1	07/24/19 13:50	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190717) Lab Sample ID: JC91782-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/19 Date Received: 07/17/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/18/19	07/18/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/18/19	07/18/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/18/19	07/18/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/18/19	07/18/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/18/19	07/18/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47128

(2) Prep QC Batch: MP16461

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190717)	Date Sampled: 07/17/19
Lab Sample ID: JC91782-1A	Date Received: 07/17/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	07/18/19 19:35	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E21 Lab Sample ID: JC91782-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/17/19 Date Received: 07/17/19 Percent Solids: 71.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	07/18/19	07/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	18.2	1.4	mg/kg	1	07/18/19	07/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	5.4	mg/kg	1	07/18/19	07/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	07/18/19	07/19/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.0	6.8	mg/kg	1	07/18/19	07/19/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47137

(2) Prep QC Batch: MP16439

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E21		Date Sampled: 07/17/19
Lab Sample ID: JC91782-2A		Date Received: 07/17/19
Matrix: SO - Soil		Percent Solids: 71.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	16.8 18.2	2.0	mg/kg	1	07/19/19 13:12	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Arcadis		Project Name: PPG Jersey City Site 107										Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OL - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Wipes FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Avenue																	
City/State/Zip: Newton NJ 08140		City/State/Zip: Jersey City NJ																	
Project Contact: Christa Mastrocola		Company Name: PPG																	
Phone #: 610-755-7080		Billing Information (if different from Report to): Client Purchase Order #: NY000770-0081400																	
Sample ID / Point of Collection		MECH/EDI Vial #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	HCl	NO3	NO2	NH4	H2S	MNE	DI Vial	MICH	ENDORE	LAB USE ONLY	
1 FB (20/19/07/19)			07/19/19	11:50	G	G	FB	4										A15	
2 BS - F21			07/19/19	12:00	G	G	SO	1										C52	
3 BS - G21			07/19/19	12:05	G	G	SO	1										D37	
4 BS - G2A			07/19/19	12:10	G	G	SO	1											
5 BS - G2B			07/19/19	12:15	G	G	SO	1											
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions							
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____		Approved By (SGS PM) / Date: _____ <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS							Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions
<input type="checkbox"/> All data available via Lablink Approval needed for 1-3 Business Day TAT		Sample Custody must be documented below each time samples change possession, including courier delivery.																	
Relinquished by: [Signature] Date / Time: 7-19-19 12:55		Received by: [Signature] Date / Time: 7-19-19 1:30				Relinquished by: [Signature] Date / Time: 7-19-19 1:30				Received by: [Signature] Date / Time: 7-19-19 1:30				Intact: <input checked="" type="checkbox"/> Not intact: <input type="checkbox"/> Preserved when applicable: <input checked="" type="checkbox"/> Absent: <input type="checkbox"/> On Ice: <input checked="" type="checkbox"/> Therm. ID: <input checked="" type="checkbox"/>					
3		5				4				4				3.4C					

INITIAL ASSESSMENT **3A**
 LABEL VERIFICATION _____

5.2
5

Report of Analysis

Client Sample ID: FB(20190719) Lab Sample ID: JC91973-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	0.0058	mg/l	1	07/20/19 00:33 EB	SW846	7196A
Chromium, Trivalent ^a	0.0078 U	0.020	0.0078	mg/l	1	07/20/19 00:33 EB	SW846	6010/7196A M
Redox Potential Vs H2	461			mv	1	07/22/19 12:10 RI	ASTM D1498-76	
pH ^b	5.55			su	1	07/19/19 18:24 AS	SM4500H+	B-11

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

(b) Sample received out of holding time for pH analysis.

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.1
4

Report of Analysis

Client Sample ID: BS-F21		Date Sampled: 07/19/19
Lab Sample ID: JC91973-2		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	0.38	mg/kg	1	07/23/19 10:21 RI		SW846 3060A/7196A
Chromium, Trivalent ^a	97.7	1.7	0.81	mg/kg	1	07/23/19 10:21 RI		SW846 6010/7196A M
Redox Potential Vs H2	212			mv	1	07/22/19 11:22 RI		ASTM D1498-76M
Solids, Percent	82.8			%	1	07/22/19 15:30 BG		SM2540 G 18TH ED MOD
pH	9.87 J			su	1	07/22/19 11:25 RI		SW846 9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.2
4

Report of Analysis

Client Sample ID: BS-G21		Date Sampled: 07/19/19
Lab Sample ID: JC91973-3		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.1 J-	0.46	0.37	mg/kg	1	07/23/19 10:24 RI	SW846	3060A/7196A
Chromium, Trivalent ^a	58.8	1.6	0.78	mg/kg	1	07/23/19 10:24 RI	SW846	6010/7196A M
Redox Potential Vs H2	780			mv	1	07/22/19 11:26 RI	ASTM	D1498-76M
Solids, Percent	86.3			%	1	07/22/19 15:30 BG	SM2540 G	18TH ED MOD
pH	2.85 J			su	1	07/22/19 11:26 RI	SW846	9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.3
4

Report of Analysis

Client Sample ID: BS-G22		Date Sampled: 07/19/19
Lab Sample ID: JC91973-4		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48 UJ-	0.48	0.38	mg/kg	1	07/23/19 10:24 RI	SW846	3060A/7196A
Chromium, Trivalent ^a	11.9	1.6	0.80	mg/kg	1	07/23/19 10:24 RI	SW846	6010/7196A M
Redox Potential Vs H2	547			mv	1	07/22/19 11:37 RI	ASTM	D1498-76M
Solids, Percent	83.8			%	1	07/22/19 15:30 BG	SM2540 G	18TH ED MOD
pH	5.62 J			su	1	07/22/19 11:28 RI	SW846	9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.4
4

Report of Analysis

Client Sample ID: BS-G23		Date Sampled: 07/19/19
Lab Sample ID: JC91973-5		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 72.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.5
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55 J-	0.55	0.44	mg/kg	1	07/23/19 10:24 RI	SW846	3060A/7196A
Chromium, Trivalent ^a	12.2	2.0	0.94	mg/kg	1	07/23/19 10:24 RI	SW846	6010/7196A M
Redox Potential Vs H2	508			mv	1	07/22/19 11:41 RI	ASTM	D1498-76M
Solids, Percent	72.5			%	1	07/22/19 15:30 BG	SM2540 G	18TH ED MOD
pH	6.48 J			su	1	07/22/19 11:30 RI	SW846	9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: BS-F21	Date Sampled: 07/19/19
Lab Sample ID: JC91973-2R	Date Received: 07/19/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	07/25/19 16:35	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-F21		Date Sampled: 07/19/19
Lab Sample ID: JC91973-2RT		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.97 J	0.20	%	1	08/15/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	08/15/19 12:30	MP	SM4500S2 - A-11-R
Total Organic Carbon ^c	50700 J	120	mg/kg	1	08/15/19 13:47	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G21	Date Sampled: 07/19/19
Lab Sample ID: JC91973-3R	Date Received: 07/19/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46	0.46	mg/kg	1	07/25/19 16:41	RI	SW846 3066A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G22	Date Sampled: 07/19/19
Lab Sample ID: JC91973-4R	Date Received: 07/19/19
Matrix: SO - Soil	Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6	0.48	mg/kg	1	07/25/19 16:41	RI	SW846 3066A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G23	Date Sampled: 07/19/19
Lab Sample ID: JC91973-5R	Date Received: 07/19/19
Matrix: SO - Soil	Percent Solids: 72.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.0	0.55	mg/kg	1	07/25/19 16:41	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: FB(20190719) Lab Sample ID: JC91973-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	4.7 U	6.0	4.7	ug/l	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Chromium	2.0 U	10	2.0	ug/l	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Nickel	1.7 U	10	1.7	ug/l	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Thallium	1.8 U	10	1.8	ug/l	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3010A ²
Vanadium	1.8 U	50	1.8	ug/l	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47149

(2) Prep QC Batch: MP16499

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.1
4

Report of Analysis

Client Sample ID: FB(20190719)		Date Sampled: 07/19/19
Lab Sample ID: JC91973-1A		Date Received: 07/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.1
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	0.0078 U	0.020	0.0078	mg/l	1	07/22/19 12:35 GT	SW846	6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: BS-F21 Lab Sample ID: JC91973-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: 82.8
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Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	0.48 U	2.3	0.48	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	97.7	1.2	0.43	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	314	4.7	0.41	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	0.68 U	1.2	0.68	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	28.7	5.9	0.22	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47155

(2) Prep QC Batch: MP16500

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.2
4

Report of Analysis

Client Sample ID: BS-F21		Date Sampled: 07/19/19
Lab Sample ID: JC91973-2A		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.2
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	97.7	1.7	0.81	mg/kg	1	07/22/19 22:03 GT		SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: BS-G21 Lab Sample ID: JC91973-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: 86.3
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Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	0.46 U	2.2	0.46	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	62.9	1.1	0.41	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	28.1	4.5	0.39	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	0.65 U	1.1	0.65	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	12.9	5.6	0.21	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47155

(2) Prep QC Batch: MP16500

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.3
4

Report of Analysis

Client Sample ID: BS-G21		Date Sampled: 07/19/19
Lab Sample ID: JC91973-3A		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.3
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	58.8	1.6	0.78	mg/kg	1	07/22/19 22:08 GT		SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: BS-G22 Lab Sample ID: JC91973-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: 83.8
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Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	0.47 U	2.3	0.47	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	12.3	1.1	0.42	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	85.3	4.6	0.40	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	0.67 U	1.1	0.67	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	13.5	5.7	0.22	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47155

(2) Prep QC Batch: MP16500

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.4
4

Report of Analysis

Client Sample ID: BS-G22		Date Sampled: 07/19/19
Lab Sample ID: JC91973-4A		Date Received: 07/19/19
Matrix: SO - Soil		Percent Solids: 83.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.4
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.6	0.80	mg/kg	1	07/22/19 22:13 GT		SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: BS-G23 Lab Sample ID: JC91973-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/19/19 Date Received: 07/19/19 Percent Solids: 72.5
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Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	0.55 U	2.7	0.55	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	12.7	1.4	0.50	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	61.2	5.4	0.47	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	0.78 U	1.4	0.78	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	10.7	6.8	0.26	mg/kg	1	07/20/19	07/22/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47155

(2) Prep QC Batch: MP16500

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

4.5
4

Report of Analysis

Client Sample ID: BS-G23	Date Sampled: 07/19/19
Lab Sample ID: JC91973-5A	Date Received: 07/19/19
Matrix: SO - Soil	Percent Solids: 72.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.5
4

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.2	2.0	0.94	mg/kg	1	07/22/19 22:19 GT	SW846	6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC92424, JC92574, JC92869, JC93064, and JC93546

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34468R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC92424, JC92574, JC92869, JC93064, and JC93546 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC92424	FB(20190730)	JC92424-1	Water	7/30/2019		X	X	X
	BS-G24	JC92424-2	Soil	7/30/2019		X	X	X
	BS-G25	JC92424-3	Soil	7/30/2019		X	X	X
	DUP-29(20190730)	JC92424-4	Soil	7/30/2019		X	X	X
JC92574	FB(20190801)	JC92574-1	Water	8/1/2019		X	X	X
	BS-D20_08012019	JC92574-2	Soil	8/1/2019		X	X	X
JC92869	FB(20190807)	JC92869-1	Water	8/7/2019		X	X	X
	BS-D20_08072019	JC92869-2	Soil	8/7/2019		X	X	X
	SW-37(10.0-10.5)	JC92869-3	Soil	8/7/2019		X	X	X
	SW-37(12.0-12.5)	JC92869-4	Soil	8/7/2019		X	X	X
JC93064	FB(20190809)	JC93064-1	Water	8/9/2019		X	X	X
	BS-E22	JC93064-2	Soil	8/9/2019		X	X	X
	BS-F22	JC93064-3	Soil	8/9/2019		X	X	X
JC93546	FB(20190820)	JC93546-1	Water	8/20/2019		X	X	X
	BS-D21	JC93546-2	Soil	8/20/2019		X	X	X
	BS-D22	JC93546-3	Soil	8/20/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. SDGs #JC92424, JC92574, JC92869, JC93064, and JC93546: Miscellaneous parameters for samples BS-G24, BS-D20_08012019, BS-D20_08072019, BS-E22, and BS-D21 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC92574, JC92869, JC93064, and JC93546: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC82424: The MS/MSD analysis performed on sample location BS-G24 exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC92574, JC92869, JC93064, and JC93546: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC92424: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-G24. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G25 / DUP-29(20190730)	Chromium	12.3	11.0	11.2%
	Trivalent Chromium	11.9	10.5	12.5%
	Nickel	22.1	14.8	AC
	Vanadium	13.5	11.4	

Notes:

AC = Acceptable

The differences in the results between the parent sample BS-G25 and field duplicate sample DUP-29(20190730) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC92574, JC92869, JC93064, and JC93546: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC92424: The serial dilution performed on sample location BS-G24 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDG #JC92424: The MS analysis performed on sample locations BS-G24 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC92424, JC92574, JC92869, JC93064, and JC93546: The MS analysis performed on sample locations BS-G24, BS-D20_08012019, BS-D20_08072019, BS-E22, and BS-D21 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
BS-G24	Hexavalent Chromium, Soluble	< 50%	< 50%
BS-D20_08012019	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	AC (94.5%)	72.1%
BS-D20_08072019	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	50.2%	
BS-E22	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	54.1%	AC (77.5%)
BS-D21	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	56.1%	

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC92424, JC92574, JC92869, JC93064, and JC93546: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC92424: The PDS analysis performed on sample locations BS-G24 exhibited recoveries within the control limits.

SDGs #JC92574, JC92869, JC93064, and JC93546: The PDS analysis performed on sample locations BS-D20_08012019, BS-D20_08072019, BS-E22, and BS-D21 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
BS-D20_08012019	Hexavalent Chromium	< 85%	< 85%
BS-D20_08072019	Hexavalent Chromium	< 85%	< 85%
BS-E22	Hexavalent Chromium	< 85%	< 85%
BS-D21	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC92424, JC92574, JC92869, JC93064, and JC93546: The laboratory duplicate analysis performed on sample locations BS-G24, BS-D20_08012019, BS-D20_08072019, BS-E22, and BS-D21 exhibited results within the control limit.

DATA REVIEW REPORT

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G25 / DUP-29(20190730)	Hexavalent Chromium	0.51 U	0.55	AC

Notes:

AC = Acceptable

The difference in the hexavalent chromium result between the parent sample BS-G25 and field duplicate sample DUP-29(20190730) was acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria		
BS-G24 BS-G25 DUP-29(20190730)	SW846 9045D	Analysis: 2 days	< 24 hours of receipt by laboratory		
BS-D20_08012019 BS-E22 BS-F22		Analysis: 4 days			
BS-D20_08072019 BS-E22		Analysis: 8 days Analysis: 13 days			
BS-D20_08012019 BS-G24 BS-D21	ASTM D3872-86	Analysis: 14 days Analysis: 16 days Analysis: 20 days	< 24 hours from collection		
BS-D20_08072019 BS-E22 BS-D20_08012019 BS-G24		SM4500S2-A		Analysis: 8 days Analysis: 13 days Analysis: 14 days Analysis: 16 days	7 days from collection

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Sample Locations	Method	Holding Time	Criteria
BS-D21		Analysis: 20 days	
BS-G24	Lloyd Kahn	Analysis: 16 days	14 days from collection
BS-D21		Analysis: 17 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

SDGs #JC93064 and JC93546: Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

SDGs #JC92424, JC92574, and JC92869: TOC was detected in the associated method blank; however, the associated sample result was greater than the BAL. No qualification of the sample result was required.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample

DATA REVIEW REPORT

concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDG #JC93064: The laboratory duplicate analysis was not performed using a sample from this SDG.

SDGs #JC92424, JC92574, JC92869, and JC93546: The laboratory duplicate analysis performed on sample locations BS-G24, BS-D20_08012019, FB(20190807), FB(20190820), and BS-D21 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
BS-G25 / DUP-29(20190730)	Redox Potential	387	406	4.8%
	pH	7.23	6.92	4.4%

The differences in the results between the parent sample BS-G25 and field duplicate sample DUP-29(20190730) were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 18, 2019

PEER REVIEW: Dennis Capria

DATE: November 5, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/enhsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC92424

Company Name	Project Name		Matrix Codes
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Company Name: Arcedis Street Address: 10 Friends Lane City: Newtown PA State: PA Zip: 18940	Project Name: PPG Jersey City Site 107 Street: 18 Chapel Avenue City: Jersey City State: NJ	Matrix Codes: DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
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Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection				# of bottles	Number of preserved bottles								LAB USE ONLY		
			Date	Time	Sampled by	Matrix		HCl	NaOH	HNO3	H2SO4	None	D/Water	MEOH	ENCORE			
1	FB(20190730)		07-30-19	0800	GR	FB	2	1	1									D62
2	BS-G24		07-30-19	0930	GR	SO	1			1								657
	BS-G24MS		07-30-19	0930	GR	SO	1			1								AZ
3	BS-G25		07-30-19	0940	GR	SO	1			1								
	DUP-29(20190730)		07-30-19	-	GR	SO	1			1								

Total chromium
Trivalent chromium
Hexavalent chromium
Antimony
Nickel
Thallium
Vanadium

Turnaround Time (Business days)	Approved by (SGS Project Manager)/Date: Initial Assessment ZAC Label Verification	Data Deliverable Information <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Date of Known Quality Protocol Reporting	Comments / Special Instructions
---------------------------------	---	---	---------------------------------

Emergency & Rush T/A data available via LabLink	Commercial "A" = Results Only; Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data	Sample inventory is verified upon receipt in the Laboratory
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Relinquished by Sampler: 1 Date Time: 07-30-19	Received By: 1 Date Time: 7-30-19	Relinquished by: 2 Date Time: 7-30-19	Received By: 2 Date Time: 7-30-19
--	---	---	---

Relinquished by: 3 Date Time: 7-30-19	Received By: 3 Date Time: 7-30-19	Relinquished by: 4 Date Time: 7-30-19	Received By: 4 Date Time: 7-30-19
---	---	---	---

Custody Seal # 07566	<input type="checkbox"/> Intact <input checked="" type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	On Ice <input checked="" type="checkbox"/> Coolers Temp. 3.2C
-----------------------------	---	--	--

Report of Analysis

Client Sample ID: FB(20190730) Lab Sample ID: JC92424-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 07/30/19 Date Received: 07/30/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	07/30/19 21:26	EB	SW846 7196A
Redox Potential Vs H2	502		mv	1	08/01/19 12:50	RI	ASTM D1498-76
pH ^a	4.81		su	1	07/30/19 18:29	AS	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G24	Date Sampled: 07/30/19
Lab Sample ID: JC92424-2	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54 J-	0.50	mg/kg	1	08/01/19 12:47	NV	SW846 3060A/7196A
Redox Potential Vs H2	363		mv	1	08/01/19 13:16	RI	ASTM D1498-76M
Solids, Percent	80		%	1	07/31/19 15:40	BG	SM2540 G 18TH ED MOD
pH	7.16 J		su	1	08/01/19 13:01	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G25	Date Sampled: 07/30/19
Lab Sample ID: JC92424-3	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51 UJ-	0.51	mg/kg	1	08/01/19 12:49	NV	SW846 3060A/7196A
Redox Potential Vs H2	387		mv	1	08/01/19 13:34	RI	ASTM D1498-76M
Solids, Percent	78.8		%	1	07/31/19 15:40	BG	SM2540 G 18TH ED MOD
pH	7.23 J		su	1	08/01/19 13:05	RI	SW846 9045D

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-29(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-4	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.55 J-	0.48	mg/kg	1	08/01/19 12:49	NV	SW846 3060A/7196A
Redox Potential Vs H2	406		mv	1	08/01/19 14:32	RI	ASTM D1498-76M
Solids, Percent	82.7		%	1	07/31/19 15:40	BG	SM2540 G 18TH ED MOD
pH	6.92 J		su	1	08/01/19 13:07	RI	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-G24	Date Sampled: 07/30/19
Lab Sample ID: JC92424-2R	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.50	0.50	mg/kg	1	08/06/19 16:41	RI	SW846-3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G24	Date Sampled: 07/30/19
Lab Sample ID: JC92424-2RT	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.21 J	0.20	%	1	08/15/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	08/15/19 12:30	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	348000 J	130	mg/kg	1	08/15/19 14:28	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G25	Date Sampled: 07/30/19
Lab Sample ID: JC92424-3R	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.51	0.51	mg/kg	1	08/06/19 16:43	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-29(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-4R	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.48	0.48	mg/kg	1	08/06/19 16:43	RI	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-1A	Date Received: 07/30/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47209

(2) Prep QC Batch: MP16640

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-1A	Date Received: 07/30/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/01/19 05:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-G24	Date Sampled: 07/30/19
Lab Sample ID: JC92424-2A	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	6.2	1.2	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	16.2	5.0	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	8.5	6.2	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47209

(2) Prep QC Batch: MP16638

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G24	Date Sampled: 07/30/19
Lab Sample ID: JC92424-2A	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 80.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	5.7	1.7	mg/kg	1	08/01/19 03:16	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-G25	Date Sampled: 07/30/19
Lab Sample ID: JC92424-3A	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.3	1.3	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	22.1	5.1	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	13.5	6.3	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47209

(2) Prep QC Batch: MP16638

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-G25		Date Sampled: 07/30/19
Lab Sample ID: JC92424-3A		Date Received: 07/30/19
Matrix: SO - Soil		Percent Solids: 78.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	11.9	1.8	mg/kg	1	08/01/19 05:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: DUP-29(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-4A	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	11.0	1.2	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	14.8	4.7	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	11.4	5.9	mg/kg	1	07/31/19	08/01/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47209

(2) Prep QC Batch: MP16638

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: DUP-29(20190730)	Date Sampled: 07/30/19
Lab Sample ID: JC92424-4A	Date Received: 07/30/19
Matrix: SO - Soil	Percent Solids: 82.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.5	1.7	mg/kg	1	08/01/19 05:07	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job # JC92574

Company Name Arcadis		Project Name PPG Jersey City Site 107		Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank		
Street Address 10 Friends Ave		Street 18 Chapel Avenue														
City State Zip Newtown PA 18940		City State Jersey City, NJ														
Project Contact Krista Mastrocola		Project # NP000770.0003.1A000														
Phone # 610-755-7080		Client Purchase Order #		City		State		Zip		Attention:		LAB USE ONLY AG G45 D38				
Sample Name(s) Cifelli 201-264-8065		Project Manager Jim McLaughlin														
Lab Sample #	Field ID / Point of Collection	MEQH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄		HNO ₂	DI Water	MEQH	ENCORE
1	FB(20190801)		8/1/19	1240	CC	WW	2			1			1			
2	BS-D20		8/1/19	1245	CC	SO	1			1		1				

5.2
5

Turnaround Time (Business days)		Data Deliverable Information										Comments / Special Instructions			
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other		Approved by (SGS Project Manager)/Date: _____		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format EQUIS <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Date of Known Quality Protocol Reporting										Sample inventory is verified upon receipt in the Laboratory	
Emergency & Rush T/A data available via LabLink		Commercial "A" = Results Only Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data													
Sample Custody must be documented below each time samples change possession, including courier delivery.															
1 Relinquished by: [Signature]	Date/Time: 8/1/19 1:20 PM	2 Received By: [Signature]	Date/Time: 8-1-19 13:20	3 Relinquished by: [Signature]	Date/Time: 8-1-19	4 Received By: [Signature]	Date/Time: 8-1-19	5 Relinquished by:	Date/Time:	Received By:	Date/Time:	Custody Seal # 25080	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not intact	Preserved where applicable <input type="checkbox"/>	Cooler Temp. 2.9C JP

Report of Analysis

Client Sample ID: FB(20190801)	Date Sampled: 08/01/19
Lab Sample ID: JC92574-1	Date Received: 08/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/01/19 23:58	EB	SW846 7196A
Redox Potential Vs H2	531		mv	1	08/05/19 09:54	RI	ASTM D1498-76
pH ^a	5.32		su	1	08/01/19 19:56	JK	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/01/19
Lab Sample ID: JC92574-2	Date Received: 08/01/19
Matrix: SO - Soil	Percent Solids: 76.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ-	0.52	mg/kg	1	08/05/19 13:13	RI	SW846 3060A/7196A
Redox Potential Vs H2	485		mv	1	08/05/19 11:34	RI	ASTM D1498-76M
Solids, Percent	76.3		%	1	08/02/19 08:20	JW	SM2540 G 18TH ED MOD
pH	6.01		su	1	08/05/19 11:26	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/01/19
Lab Sample ID: JC92574-2R	Date Received: 08/01/19
Matrix: SO - Soil	Percent Solids: 76.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	08/07/19 13:59	RI	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/01/19
Lab Sample ID: JC92574-2RT	Date Received: 08/01/19
Matrix: SO - Soil	Percent Solids: 76.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.35 J	0.20	%	1	08/15/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	08/15/19 12:30	MP	SM4500S2- A-11
Total Organic Carbon ^c	226000	130	mg/kg	1	08/15/19 15:20	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: FB(20190801) Lab Sample ID: JC92574-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/01/19 Date Received: 08/01/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/02/19	08/02/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/02/19	08/02/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/02/19	08/02/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/02/19	08/02/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/02/19	08/02/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47223

(2) Prep QC Batch: MP16664

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190801)	Date Sampled: 08/01/19
Lab Sample ID: JC92574-1A	Date Received: 08/01/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/02/19 17:11	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/01/19
Lab Sample ID: JC92574-2A	Date Received: 08/01/19
Matrix: SO - Soil	Percent Solids: 76.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	08/02/19	08/02/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	9.2	1.4	mg/kg	1	08/02/19	08/02/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	94.5	5.4	mg/kg	1	08/02/19	08/02/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	08/02/19	08/02/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	13.1	6.8	mg/kg	1	08/02/19	08/02/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47223

(2) Prep QC Batch: MP16668

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/01/19
Lab Sample ID: JC92574-2A	Date Received: 08/01/19
Matrix: SO - Soil	Percent Solids: 76.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	8.7	1.9	mg/kg	1	08/02/19 17:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #
	KE-170119-121 5092869

Company Name Arcadis		Project Name PPG Jersey City Site 107		Matrix Codes																																		
Street Address 10 Friends Lane		Street 18 Chapel Avenue		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																																		
City State Zip Newtown PA 18940		City State Jersey City NJ																																				
Project Contact Krista Mastrocola		Project # NP000770.0003.1A000																																				
Phone # 610-755-7080		Client Purchase Order #																																				
E-mail C.Cifelli		Project Manager Jim McLaughlin		Billing Information (if different from Report to) Company Name Street Address City State Zip Attention:																																		
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	Number of preserved bottles					Total chromium	Trivalent chromium	Hexavalent chromium	Antimony	Nickel	Thallium	Vanadium	LAB USE ONLY																		
								HCl	NIOSH	NIHDS	H2SO4	NONE									DI Water	MEOH	ENCORE															
1	FB(20190807)		8/2/19	7:00	CC	FB	2																															
2	BS-D20		8/7/19	7:45	CC	SO	1																															
3	SW-37 (10.0-10.5)		8/7/19	0920	CC	SO	1																															
4	SW-37 (12.0-12.5)		8/7/19	0930	CC	SO	1																															
	BS-F315		8/7/19	1200	CC	SO	1																															

5.2
5

Report of Analysis

Client Sample ID: FB(20190807)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-1	Date Received: 08/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/07/19 23:03	EB	SW846 7196A
Redox Potential Vs H2	442		mv	1	08/08/19 09:08	MS	ASTM D1498-76
pH ^a	5.61		su	1	08/07/19 18:26	AC	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/07/19
Lab Sample ID: JC92869-2	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 72.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.55 UJ-	0.55	mg/kg	1	08/09/19 13:18	RI	SW846 3060A/7196A
Redox Potential Vs H2	270		mv	1	08/08/19 13:12	MS	ASTM D1498-76M
Solids, Percent	72.3		%	1	08/08/19 08:56	JW	SM2540 G 18TH ED MOD
pH	6.97		su	1	08/08/19 13:12	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-37(10.0-10.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-3	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47 UJ-	0.47	mg/kg	1	08/09/19 13:22	RI	SW846 3060A/7196A
Redox Potential Vs H2	285		mv	1	08/08/19 13:24	MS	ASTM D1498-76M
Solids, Percent	85.7		%	1	08/08/19 08:56	JW	SM2540 G 18TH ED MOD
pH	8.07		su	1	08/08/19 13:24	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-37(12.0-12.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-4	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52 UJ-	0.52	mg/kg	1	08/09/19 13:22	RI	SW846 3060A/7196A
Redox Potential Vs H2	312		mv	1	08/08/19 13:28	MS	ASTM D1498-76M
Solids, Percent	77.3		%	1	08/08/19 08:56	JW	SM2540 G 18TH ED MOD
pH	7.62		su	1	08/08/19 13:28	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/07/19
Lab Sample ID: JC92869-2R	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 72.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.63	0.55	mg/kg	1	08/13/19 15:16	NV	SW846 3060A/7196A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D20		Date Sampled: 08/07/19
Lab Sample ID: JC92869-2RT		Date Received: 08/07/19
Matrix: SO - Soil		Percent Solids: 72.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.87 J	0.20	%	1	08/15/19 12:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	08/15/19 12:30	MP	SM4500S2- A-11
Total Organic Carbon	18200	140	mg/kg	1	08/15/19 11:07	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-37(10.0-10.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-3R	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.47	0.47	mg/kg	1	08/13/19 15:22	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-37(12.0-12.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-4R	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.52	0.52	mg/kg	1	08/13/19 15:22	NV	SW846 3060A/7196A

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: FB(20190807)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-1A	Date Received: 08/07/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/07/19	08/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/07/19	08/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/07/19	08/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/07/19	08/08/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/07/19	08/08/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47255

(2) Prep QC Batch: MP16729

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190807)		Date Sampled: 08/07/19
Lab Sample ID: JC92869-1A		Date Received: 08/07/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/08/19 15:45	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D20 Lab Sample ID: JC92869-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/07/19 Date Received: 08/07/19 Percent Solids: 72.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	15.7	1.3	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	11.6	5.3	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	22.9	6.6	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47257

(2) Prep QC Batch: MP16746

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D20	Date Sampled: 08/07/19
Lab Sample ID: JC92869-2A	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 72.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	15.7	1.9	mg/kg	1	08/09/19 01:16	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-37(10.0-10.5) Lab Sample ID: JC92869-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/07/19 Date Received: 08/07/19 Percent Solids: 85.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	26.8	1.1	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	30.2	4.5	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.5	5.7	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47257

(2) Prep QC Batch: MP16746

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-37(10.0-10.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-3A	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 85.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.8	1.6	mg/kg	1	08/09/19 01:21	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-37(12.0-12.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-4A	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	27.9	1.2	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	84.0	5.0	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	31.4	6.2	mg/kg	1	08/08/19	08/09/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47257

(2) Prep QC Batch: MP16746

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-37(12.0-12.5)	Date Sampled: 08/07/19
Lab Sample ID: JC92869-4A	Date Received: 08/07/19
Matrix: SO - Soil	Percent Solids: 77.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	27.9	1.7	mg/kg	1	08/09/19 01:26	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4



FB
SD

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusa

FED-EX Tracking #	Order Control #
SGS Order #	SGS Job # JC93064

Report Information		Project Information										Requested Analysis (see TEST CODE sheet)							Matrix Codes																			
Company Name Arcadis		Project Name PPG Jersey City Site 107										Total chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank																			
Street Address 10 Friends Lane		Street 18 Chapel Avenue																																				
City State Zip Newtown PA 18940		City State Jersey City NJ																																				
Project Contact Krista Mastrocola		Project # NP000770.0003.1A000																																				
Phone # 610-755-7080		Client Purchase Order #										Billing Information (if different from Report to)		Company Name		Street Address		City State Zip																				
Sampler(s) Name(s) C. Citelli		Phone # 201-264-8065		Project Manager Jim McLaughlin		Attention:		Collection		Number of preserved bottles		HE		NIOSH		HMO3		HSCM		NONE		DI Water		MEDH		ENCORE												
Lab Sample #	Field ID / Point of Collection	MECH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HE	NIOSH	HMO3	HSCM	NONE	DI Water	MEDH	ENCORE	X		X		X		X		X		X		X		X		X		X		X		
1	FB(20190809)		8/9/19	0900	cc	FB	4					2																										
2	BS - E22		8/9/19	0945	cc	SO	1					1																										
3	BS - F20		8/9/19	1300	CC	SO	1					1																										

5.2
5

Turnaround Time (Business days)	Data Deliverable Information	Comments / Special Instructions
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<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other	Approved by (SGS Project Manager)/Date: <u>Initial Assessment 2 BSPG</u> <u>Label Verification</u>	<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ Date of Known Quality Protocol Reporting Commercial "A" = Results Only Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data	<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUB <input type="checkbox"/> Other
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Emergency & Rush T/A data available via LabLink Sample inventory is verified upon receipt in the Laboratory

Relinquished By: [Signature]	Date Time: 8/9/19/1315	Relinquished By: [Signature]	Date Time: 8-9-19	Relinquished By: [Signature]	Date Time: 1755	Relinquished By: [Signature]	Date Time: 1755
Relinquished By: [Signature]	Date Time: 8/9/19/1315	Relinquished By: [Signature]	Date Time: 8-9-19	Relinquished By: [Signature]	Date Time: 1755	Relinquished By: [Signature]	Date Time: 1755
Relinquished By: [Signature]	Date Time: 8/9/19/1315	Relinquished By: [Signature]	Date Time: 8-9-19	Relinquished By: [Signature]	Date Time: 1755	Relinquished By: [Signature]	Date Time: 1755

Custody Seal # 35502	<input checked="" type="checkbox"/> Intact	<input type="checkbox"/> Not intact	Preserved where applicable	On Ice <input checked="" type="checkbox"/>	Cooler Temp. 2.66
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Report of Analysis

Client Sample ID: FB(20190809)	Date Sampled: 08/09/19
Lab Sample ID: JC93064-1	Date Received: 08/09/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/09/19 23:26	EB	SW846 7196A
Redox Potential Vs H2	478		mv	1	08/13/19 11:45	RI	ASTM D1498-76
pH ^a	5.62		su	1	08/09/19 14:44	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-2	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.61 UJ-	0.61	mg/kg	1	08/13/19 13:38	NV	SW846 3060A/7196A
Redox Potential Vs H2	174		mv	1	08/13/19 13:01	RI	ASTM D1498-76M
Solids, Percent	65.8		%	1	08/12/19 16:30	BG	SM2540 G 18TH ED MOD
pH	6.48 J		su	1	08/13/19 12:41	RI	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-2R	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.61	0.61	mg/kg	1	08/15/19 14:36	NV	SW846 3066A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-E22		Date Sampled: 08/09/19
Lab Sample ID: JC93064-2RT		Date Received: 08/09/19
Matrix: SO - Soil		Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.86 J	0.20	%	1	08/22/19 11:30	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE UJ			1	08/22/19 11:30	MP	SM4500S2- A-11
Total Organic Carbon ^c	15400	150	mg/kg	1	08/22/19 14:11	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-3	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.78 UJ-	0.78	mg/kg	1	08/13/19 13:44	NV	SW846 3060A/7196A
Redox Potential Vs H2	87.0		mv	1	08/13/19 13:26	RI	ASTM D1498-76M
Solids, Percent	51.3		%	1	08/12/19 16:30	BG	SM2540 G 18TH ED MOD
pH	7.02 J		su	1	08/13/19 12:43	RI	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-3R	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.78	0.78	mg/kg	1	08/15/19 14:43	NV	SW846-3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FB(20190809) Lab Sample ID: JC93064-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/09/19 Date Received: 08/09/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/10/19	08/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/10/19	08/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/10/19	08/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/10/19	08/12/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/10/19	08/12/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47269

(2) Prep QC Batch: MP16785

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190809)		Date Sampled: 08/09/19
Lab Sample ID: JC93064-1A		Date Received: 08/09/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/12/19 15:13	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-E22		Date Sampled: 08/09/19
Lab Sample ID: JC93064-2A		Date Received: 08/09/19
Matrix: SO - Soil		Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.0	3.0	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	10.1	1.5	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	7.5	5.9	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.5	1.5	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.0	7.4	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47269

(2) Prep QC Batch: MP16782

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-2A	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 65.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.1	2.1	mg/kg	1	08/12/19 17:18	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-F22		Date Sampled: 08/09/19
Lab Sample ID: JC93064-3A		Date Received: 08/09/19
Matrix: SO - Soil		Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.8	3.8	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.6	1.9	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	23.4	7.6	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.9	1.9	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	38.1	9.5	mg/kg	1	08/10/19	08/12/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47269

(2) Prep QC Batch: MP16782

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F22	Date Sampled: 08/09/19
Lab Sample ID: JC93064-3A	Date Received: 08/09/19
Matrix: SO - Soil	Percent Solids: 51.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.6	2.7	mg/kg	1	08/12/19 17:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX 732-329-3499
www.sgs.com/ehsusat

FED-EX Tracking #	Buyer Order Control #
SGS Quote #	SGS Job #
	KE-010119-127
	JC93546

Client / Reporting information		Project Information				Requested Analysis (see TEST CODE sheet)												Matrix Codes																																																																																																																														
Company Name Arcadis		Project Name PPG Jersey City Site 107				<table border="1"> <tr><td>Total chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Trivalent chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Hexavalent chromium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Antimony</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Nickel</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Thallium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Vanadium</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </table>												Total chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Trivalent chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Hexavalent chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Total chromium	X	X	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																			
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Hexavalent chromium	X	X	X	X	X													X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																			
Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																															
Nickel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																															
Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																															
Vanadium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																																																																																																															
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City State Zip Newtown PA 18940		City State Jersey City NJ		Company Name																																																																																																																																												
Project Contact Krista Mastrocola		Project # NP000770-06031A000		Street Address																																																																																																																																												
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Sampler(s) Name(s) C Cifelli		Phone # 201-264-8065		Project Manager Jim McLaughlin																																																																																																																																												
Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection				Number of preserved bottles												LAB USE ONLY																																																																																																																													
			Date	Time	Sampled by	Matrix	# of bottles	HCl	NH ₄ OH	HNO ₃	H ₂ SO ₄	NONE	DI Water	DI Water	MEOH	ENCOURE																																																																																																																																
1	FB (20190820)		8/20/19	0830	CC	FB	2		1	1	0							A33																																																																																																																														
2	BS-D21		8/20/19	0945	CC	SO	1				1								G2																																																																																																																													
3	BS-D22		8/20/19	1000	CC	SO	1				1								D14																																																																																																																													
Turnaround Time (Business days)		Approved by (SGS Project Manager)/Date: INITIAL ASSESSMENT 2AAC				Data Deliverable Information												Comments / Special Instructions																																																																																																																														
<input type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input checked="" type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> other						<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> EDD Format <input type="checkbox"/> Commercial "C" <input type="checkbox"/> Other <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting												EQUS Sample inventory is verified upon receipt in the Laboratory																																																																																																																														
Emergency & Rush T/A data available via LabLink																																																																																																																																																
Sample Custody must be documented below each time samples change possession, including courier delivery.																																																																																																																																																
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5.2
5

Report of Analysis

Client Sample ID: FB(201908020) Lab Sample ID: JC93546-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/20/19 Date Received: 08/20/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/20/19 23:10	EB	SW846 7196A
Redox Potential Vs H2	495		mv	1	08/21/19 10:49	MS	ASTM D1498-76
pH ^a	7.89		su	1	08/20/19 17:44	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D21	Date Sampled: 08/20/19
Lab Sample ID: JC93546-2	Date Received: 08/20/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54 UJ-	0.54	mg/kg	1	08/21/19 19:00	EB	SW846 3060A/7196A
Redox Potential Vs H2	200		mv	1	08/21/19 14:45	MS	ASTM D1498-76M
Solids, Percent	73.7		%	1	08/21/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.13		su	1	08/21/19 14:45	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D21	Date Sampled: 08/20/19
Lab Sample ID: JC93546-2R	Date Received: 08/20/19
Matrix: SO - Soil	Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.54	0.54	mg/kg	1	08/23/19 16:22	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D21		Date Sampled: 08/20/19
Lab Sample ID: JC93546-2RT		Date Received: 08/20/19
Matrix: SO - Soil		Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	1.0 J	0.20	%	1	09/09/19 09:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/09/19 09:00	MP	SM4500S2 - A-11 R
Total Organic Carbon ^c	24200 J	140	mg/kg	1	09/06/19 13:38	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-D22	Date Sampled: 08/20/19
Lab Sample ID: JC93546-3	Date Received: 08/20/19
Matrix: SO - Soil	Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.59 UJ-	0.59	mg/kg	1	08/21/19 19:11	EB	SW846 3060A/7196A
Redox Potential Vs H2	246		mv	1	08/21/19 14:47	MS	ASTM D1498-76M
Solids, Percent	67.9		%	1	08/21/19 09:15	RC	SM2540 G 18TH ED MOD
pH	7.03		su	1	08/21/19 14:47	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D22	Date Sampled: 08/20/19
Lab Sample ID: IC93546-3R	Date Received: 08/20/19
Matrix: SO - Soil	Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.74	0.59	mg/kg	1	08/23/19 16:28	NV	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: FB(201908020) Lab Sample ID: JC93546-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/20/19 Date Received: 08/20/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/21/19	08/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/21/19	08/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/21/19	08/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/21/19	08/21/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/21/19	08/21/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47318

(2) Prep QC Batch: MP16913

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(201908020) Lab Sample ID: JC93546-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/20/19 Date Received: 08/20/19 Percent Solids: n/a
---	---

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/21/19 15:50	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D21		Date Sampled: 08/20/19
Lab Sample ID: JC93546-2A		Date Received: 08/20/19
Matrix: SO - Soil		Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.7	2.7	mg/kg	1	08/21/19	08/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	13.9	1.3	mg/kg	1	08/21/19	08/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	10.9	5.3	mg/kg	1	08/21/19	08/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/21/19	08/22/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	21.8	6.7	mg/kg	1	08/21/19	08/22/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47321

(2) Prep QC Batch: MP16916

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D21		Date Sampled: 08/20/19
Lab Sample ID: JC93546-2A		Date Received: 08/20/19
Matrix: SO - Soil		Percent Solids: 73.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	13.9	1.8	mg/kg	1	08/22/19 08:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D22		Date Sampled: 08/20/19
Lab Sample ID: JC93546-3A		Date Received: 08/20/19
Matrix: SO - Soil		Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.8	2.8	mg/kg	1	08/21/19	08/22/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.5	1.4	mg/kg	1	08/21/19	08/22/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	11.5	5.7	mg/kg	1	08/21/19	08/22/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.4	1.4	mg/kg	1	08/21/19	08/22/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	19.2	7.1	mg/kg	1	08/21/19	08/22/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47321

(2) Prep QC Batch: MP16916

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D22		Date Sampled: 08/20/19
Lab Sample ID: JC93546-3A		Date Received: 08/20/19
Matrix: SO - Soil		Percent Solids: 67.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	2.0	mg/kg	1	08/22/19 08:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDGs #JC93647, JC93723, JC93833, JC93950, and JC94114

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34469R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # JC93647, JC93723, JC93833, JC93950, and JC94114 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						Cr VI	MET	MISC
JC93647	FB(20190821)	JC93647-1	Water	8/21/2019		X	X	X
	CS-D23	JC93647-2	Soil	8/21/2019		X	X	X
	CS-E23	JC93647-3	Soil	8/21/2019		X	X	X
	CS-F23	JC93647-4	Soil	8/21/2019		X	X	X
JC93723	FB(20190822)	JC93723-1	Water	8/22/2019		X	X	X
	CS-E31	JC93723-2	Soil	8/22/2019		X	X	X
JC93833	FB(20190823)	JC93833-1	Water	8/23/2019		X	X	X
	CS-DS-MDE	JC93833-2	Soil	8/23/2019		X	X	X
	CS-MC-F23	JC93833-3	Soil	8/23/2019		X	X	X
	CS-DC-F23	JC93833-4	Soil	8/23/2019		X	X	X
JC93950	FB(20190827)	JC93950-1	Water	8/27/2019		X	X	X
	BS-D23	JC93950-2	Soil	8/27/2019		X	X	X
	BS-E23	JC93950-3	Soil	8/27/2019		X	X	X
	BS-F23	JC93950-4	Soil	8/27/2019		X	X	X
	BS-E31	JC93950-5	Soil	8/27/2019		X	X	X
JC94114	FB(20190829)	JC94114-1	Water	8/29/2019		X	X	X
	BS-D24	JC94114-2	Soil	8/29/2019		X	X	X
	BS-E24	JC94114-3	Soil	8/29/2019		X	X	X
	BS-F24	JC94114-4	Soil	8/29/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.

DATA REVIEW REPORT

4. SDGs #JC93647, JC93723, JC93833, JC93950, and JC94114: Miscellaneous parameters for samples CS-D23, CS-E31, CS-DC-F23, BS-D23, and BS-D24 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 6020B, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C
SW-846 6020B	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

DATA REVIEW REPORT

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Internal Standard Performance (SW-846 6020B analysis only)

Internal standard performance criteria ensure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

5.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

SDGs #JC93647, JC93723, JC93833, and JC94114: The MS/MSD analysis was not performed using a sample from these SDGs.

SDG #JC93950: The MS/MSD analysis performed on sample location BS-D23 in association with method SW-846 6020B analysis exhibited recoveries within the control limits.

5.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC93647, JC93723, JC93833, and JC94114: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDG #JC93950: MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample BS-D23 in association with method SW-846 6020B analysis. The MS/MSD recoveries exhibited an acceptable RPD.

DATA REVIEW REPORT

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

8. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

SDGs #JC93647, JC93723, JC93833, and JC94114: The serial dilution analysis was not performed using a sample from these SDGs.

SDG #JC93950: The serial dilution performed on sample location BS-D23 in association with method SW-846 6020D analysis exhibited %D within control limits.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C, 6020B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

SDGs #JC93647, JC93723, and JC94114: The MS analysis performed on sample locations CS-D23, CS-E31, and BS-D24 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

SDGs #JC93647, JC93723, JC93833, JC93950, and JC94114: The MS analysis performed on sample locations CS-D23, CS-E31, CS-DC-F23, BS-D23, and BS-D24 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
CS-D23	Hexavalent Chromium, Soluble	< 50%	< 50%
CS-E31	Hexavalent Chromium, Soluble	56.4%	68.2%
CS-DC-F23	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	69.4%	AC (85.1%)
BS-D23	Hexavalent Chromium, Soluble	< 50%	< 50%
	Hexavalent Chromium, Insoluble	AC (77.4%)	59.4%
BS-D24	Hexavalent Chromium, Soluble	< 50%	< 50%

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

SDGs #JC93647, JC93723, JC93833, JC93950, and JC94114: The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

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4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

SDG #JC93723: The PDS analysis performed on sample location CS-E31 exhibited recoveries within the control limits.

SDGs #JC93647, JC93833, JC93950, and JC94114: The PDS analysis performed on sample locations CS-D23, CS-DC-F23, BS-D23, and BS-D24 exhibited recoveries outside of the control limits as presented in the table below.

Sample Location	Analyte	PDS Recovery	Reanalysis PDS Recovery
CS-D23	Hexavalent Chromium	< 85%	< 85%
CS-DC-F23	Hexavalent Chromium	< 85%	< 85%
BS-D23	Hexavalent Chromium	< 85%	< 85%
BS-D24	Hexavalent Chromium	< 85%	< 85%

Since all the samples are from the same site, it is assumed the matrix interference exists for all samples in a reducing environment. It was noted from the Eh pH results that soil samples are in a reducing environment and don't support the presence of hexavalent chromium.

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
PDS recovery < 85%	Non-detect	UJ-
	Detect	J-
PDS recovery > 115%	Non-detect	No Action
PDS recovery > 115%	Detect	J+

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

SDGs #JC93647, JC93723, JC93833, JC93950, and JC94114: The laboratory duplicate analysis performed on sample locations CS-D23, CS-E31, CS-DC-F23, BS-D23, and BS-D24 exhibited results within the control limit.

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5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
CS-E31	SW846 9045D	Analysis: 4 days	< 24 hours of receipt by laboratory
CS-DS-MDE		Analysis: 3 days	
CS-MC-F23			
CS-DC-F23		Analysis: 2 days	
BS-D24			
BS-E24			
BS-F24	ASTM D3872-86	Analysis: 19 days	< 24 hours from collection
CS-D23		Analysis: 18 days	
CS-E31			
CS-DC-F23			
BS-D23			
BS-D24			
CS-D23	SM4500S2-A	Analysis: 19 days	7 days from collection
CS-E31		Analysis: 18 days	
CS-DC-F23		Analysis: 17 days	

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Sample Locations	Method	Holding Time	Criteria
BS-D23		Analysis: 23 days	
BS-D24		Analysis: 21 days	
CS-D23		Analysis: 19 days	
CS-E31	Lloyd Kahn	Analysis: 18 days	14 days from collection
CS-DC-F23		Analysis: 17 days	

Sample results were qualified as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and

DATA REVIEW REPORT

35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

SDGs #JC93723 and JC93833: The laboratory duplicate analysis was not performed using a sample from these SDGs.

SDGs #JC93647, JC93950, and JC94114: The laboratory duplicate analysis performed on sample locations FB(20190821), FB(20190827), BS-D23, FB(20190829), and BS-D24 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 22, 2019

PEER REVIEW: Dennis Capria

DATE: November 5, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Report of Analysis

Client Sample ID: FB(20190821) Lab Sample ID: JC93647-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/21/19 Date Received: 08/21/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/21/19 23:23	EB	SW846 7196A
Redox Potential Vs H2	436		mv	1	08/22/19 14:14	MS	ASTM D1498-76
pH ^a	5.34		su	1	08/21/19 16:48	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-D23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-2	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.5 J-	0.47	mg/kg	1	08/22/19 16:05	NV	SW846 3060A/7196A
Redox Potential Vs H2	326		mv	1	08/22/19 21:35	MS	ASTM D1498-76M
Solids, Percent	85.4		%	1	08/22/19 08:45	RC	SM2540 G 18TH ED MOD
pH	7.20		su	1	08/22/19 21:35	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-D23	Date Sampled: 08/21/19
Lab Sample ID: IC93647-2R	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.7	0.47	mg/kg	1	08/25/19 14:20	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-D23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-2RT		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.71 J	0.20	%	1	09/09/19 09:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/09/19 09:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	110000 J	120	mg/kg	1	09/09/19 12:34	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-E23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-3	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.46	mg/kg	1	08/22/19 16:11	NV	SW846 3060A/7196A
Redox Potential Vs H2	320		mv	1	08/22/19 21:36	MS	ASTM D1498-76M
Solids, Percent	86.3		%	1	08/22/19 08:45	RC	SM2540 G 18TH ED MOD
pH	7.83		su	1	08/22/19 21:36	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-E23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-3R	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.46	mg/kg	1	08/25/19 14:26	NV	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: CS-F23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-4	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 76.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2 J-	0.52	mg/kg	1	08/22/19 16:11	NV	SW846 3060A/7196A
Redox Potential Vs H2	318		mv	1	08/22/19 21:37	MS	ASTM D1498-76M
Solids, Percent	76.5		%	1	08/22/19 08:45	RC	SM2540 G 18TH ED MOD
pH	7.56		su	1	08/22/19 21:37	MS	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: CS-F23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-4R	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 76.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68	0.52	mg/kg	1	08/25/19 14:26	NV	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: FB(20190821)		Date Sampled: 08/21/19
Lab Sample ID: JC93647-1A		Date Received: 08/21/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/22/19	08/22/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/22/19	08/22/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/22/19	08/22/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/22/19	08/22/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/22/19	08/22/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47325

(2) Prep QC Batch: MP16933

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190821)	Date Sampled: 08/21/19
Lab Sample ID: JC93647-1A	Date Received: 08/21/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/22/19 17:43	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-D23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-2A		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3	2.3	mg/kg	1	08/22/19	08/23/19 EAL	SW846 6010D ¹	SW846 3050B ³
Chromium ^a	5.9	5.7	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ²	SW846 3050B ³
Nickel	377	4.6	mg/kg	1	08/22/19	08/23/19 EAL	SW846 6010D ¹	SW846 3050B ³
Thallium	< 1.1	1.1	mg/kg	1	08/22/19	08/23/19 EAL	SW846 6010D ¹	SW846 3050B ³
Vanadium	16.5	5.7	mg/kg	1	08/22/19	08/23/19 ND	SW846 6010D ²	SW846 3050B ³

(1) Instrument QC Batch: MA47325

(2) Instrument QC Batch: MA47326

(3) Prep QC Batch: MP16935

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-D23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-2A		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 6.2	6.2	mg/kg	1	08/23/19 07:39	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-E23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-3A		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 11	11	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	11.1	5.7	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel ^a	2340	23	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 5.7	5.7	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	39.7	5.7	mg/kg	1	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47326

(2) Prep QC Batch: MP16935

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-E23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-3A	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.6	6.2	mg/kg	1	08/23/19 07:44	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-F23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-4A		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 76.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 13	13	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	40.3	6.3	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel ^a	1170	25	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 6.3	6.3	mg/kg	5	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	47.6	6.3	mg/kg	1	08/22/19	08/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47326

(2) Prep QC Batch: MP16935

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-F23		Date Sampled: 08/21/19
Lab Sample ID: JC93647-4A		Date Received: 08/21/19
Matrix: SO - Soil		Percent Solids: 76.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	37.1	6.8	mg/kg	1	08/23/19 07:49	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-E23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-3AR	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 86.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.2	1.2	mg/kg	5	08/29/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²
Thallium	< 0.29	0.29	mg/kg	5	08/29/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47374

(2) Prep QC Batch: MP17074A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-F23	Date Sampled: 08/21/19
Lab Sample ID: JC93647-4AR	Date Received: 08/21/19
Matrix: SO - Soil	Percent Solids: 76.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.3	1.3	mg/kg	5	08/29/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²
Thallium	0.35	0.32	mg/kg	5	08/29/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47374

(2) Prep QC Batch: MP17074A

RL = Reporting Limit

4.2
4



SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2236 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3490
www.sgs.com/ehsusa

E

FEB-EX Tracking #	Both Chain Control #
SGS Guide #	NI2-070119-134 JC93723

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Accadis		Project Name: PPG Jersey City Site 107										Total chromium Trivalent chromium Hexavalent chromium Antimony Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LI - Oil LIQ - Other Liquid ABS - Air SOL - Other Solid WP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																	
City, State, Zip: Newtown PA 18940		City, State, Zip: Jersey City NJ																	
Project Contact, Email, Phone #: Krista Mastrocola 610-755-7080		Project #, Client Purchase Order #, Street Address, City, State, Zip: NP000770, 0003, 1A000																	
Sampler(s) Name(s), Phone #: C. Cifelli 201-264-8015		Project Manager, Attention: Tim McLaughlin																	
SGS Sample #	Field ID / Point of Collection	MEQ/VI	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	HCl	HNO ₃	H ₂ O ₂	NONE	DI Water	MECH	ENDURE	LAB USE ONLY			
1	FB(20190822)		8/22/19	0730	CC	G		2								X	A37		
2	CS-E31		8/22/19	1200	CC	C		1								X	M4 D13		

5.2
5

Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions			
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved By (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUIS		<input type="checkbox"/> DOD-QSMS Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions	
Sample Custody must be documented below each time samples change possession, including courier delivery.							
Relinquished by:	Date / Time:	Relinquished by:	Date / Time:	Relinquished by:	Date / Time:		
1 <i>Jadali</i>	8/23/19 1020	2 <i>Robinson</i>	8-22-19 1715	3 <i>Robinson</i>	8-22-19		
Relinquished by:	Date / Time:	Relinquished by:	Date / Time:	Relinquished by:	Date / Time:		
3		4		5			
Custody, Seal #		Intact		Preserved where applicable			
04146		<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Absent			
		<input type="checkbox"/> Not intact		Therm. ID			
				On Ice <input checked="" type="checkbox"/>			
				Cooler Temp. 2.5°C			
				<i>IT</i>			

Initial Assessment *BAC*
Label Verification _____



Report of Analysis

Client Sample ID: FB(20190822)		Date Sampled: 08/22/19
Lab Sample ID: JC93723-1		Date Received: 08/22/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/22/19 22:36	EB	SW846 7196A
Redox Potential Vs H2	501		mv	1	08/23/19 12:48	RI	ASTM D1498-76
pH ^a	5.88		su	1	08/22/19 17:50	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-E31	Date Sampled: 08/22/19
Lab Sample ID: JC93723-2	Date Received: 08/22/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	08/23/19 17:20	NV	SW846 3060A/7196A
Redox Potential Vs H2	328		mv	1	08/26/19 12:22	MS	ASTM D1498-76M
Solids, Percent	88.6		%	1	08/25/19 14:11	BG	SM2540 G 18TH ED MOD
pH	8.25 J		su	1	08/26/19 12:22	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-E31	Date Sampled: 08/22/19
Lab Sample ID: JC93723-2R	Date Received: 08/22/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45	0.45	mg/kg	1	08/27/19 18:10	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-E31		Date Sampled: 08/22/19
Lab Sample ID: JC93723-2T		Date Received: 08/22/19
Matrix: SO - Soil		Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.45 J	0.20	%	1	09/09/19 09:00	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/09/19 09:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	3270 J	110	mg/kg	1	09/09/19 13:13	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190822) Lab Sample ID: JC93723-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/22/19 Date Received: 08/22/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47334

(2) Prep QC Batch: MP16951

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190822)	Date Sampled: 08/22/19
Lab Sample ID: JC93723-1A	Date Received: 08/22/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/24/19 01:53	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-E31 Lab Sample ID: JC93723-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/22/19 Date Received: 08/22/19 Percent Solids: 88.6
--	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1	2.1	mg/kg	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	12.5	1.1	mg/kg	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.5	4.3	mg/kg	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	14.0	5.4	mg/kg	1	08/23/19	08/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47334

(2) Prep QC Batch: MP16948

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-E31	Date Sampled: 08/22/19
Lab Sample ID: JC93723-2A	Date Received: 08/22/19
Matrix: SO - Soil	Percent Solids: 88.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	12.5	1.6	mg/kg	1	08/24/19 04:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Client / Reporting Information		Project Information		Requested Analysis												Matrix Codes												
Company Name: Arcadis		Project Name: PPG Jersey City Site 107														DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank												
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																										
City: Newtown PA 18940		City: Jersey City NJ																										
Project Contact: Krista Mastrow		Project #: N/A00770.0003.1A000																										
Phone #: 610-755-7080		Client Purchase Order #: 																										
Sample(s) Name(s): C. Cifelli		Project Manager: Jim McLaughlin																										
Field ID / Point of Collection		MEQ/CI Via #		Date		Time		Sampled By		Lab ID		Matrix		# of Bottles		Number of preserved Bottles												LAB USE ONLY
1 FB (20190823)				8/23/19		0900		CC		FB		2																
2 CS-DS-MDE				8/23/19		1115		CC		G		S0														A37		
3 CS-MC-F23				8/23/19		1130		CC		G		S0														M5		
4 CS-DC-F23				8/23/19		1200		CC		G		S0														D48		
Turn Around Time (Business Days)		Deliverable		Comments / Special Instructions																								
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other All data available via Lablink		INITIAL ASSESSMENT - SHX LABEL VERIFICATION		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier I (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP <input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format: EQUIS Commercial "A" = Results only; Commercial "B" = Results + QC Summary Commercial "C" = Results + QC Summary + Partial Raw data http://www.sgs.com/en/terms-and-conditions																								
Relinquished by: [Signature]		Date / Time: 8/23/19		Received By: Robert Chambers		Date / Time: 8/23/19		Relinquished By: Robert Chambers		Date / Time: 8/23/19		Received By: [Signature]		Date / Time: 8/23/19		Received By: [Signature]		Date / Time: 8/23/19										
Relinquished by: [Signature]		Date / Time: 8/23/19		Received By: [Signature]		Date / Time: 8/23/19		Relinquished By: [Signature]		Date / Time: 8/23/19		Received By: [Signature]		Date / Time: 8/23/19		Received By: [Signature]		Date / Time: 8/23/19										
Custody Seal # 03642		Intact <input type="checkbox"/>		Not intact <input type="checkbox"/>		Preserved where applicable <input type="checkbox"/>		Absent <input type="checkbox"/>		Therm. ID: IP 330C		On Ice <input checked="" type="checkbox"/>		Cooler Temp. 330C														

5.2
5

Report of Analysis

Client Sample ID: FB(20190823)	Date Sampled: 08/23/19
Lab Sample ID: JC93833-1	Date Received: 08/23/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/23/19 22:58	EB	SW846 7196A
Redox Potential Vs H2	370		mv	1	08/26/19 15:50	MS	ASTM D1498-76
pH ^a	5.90		su	1	08/23/19 19:23	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-DS-MDE	Date Sampled: 08/23/19
Lab Sample ID: JC93833-2	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.2 J-	0.47	mg/kg	1	08/26/19 18:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	391		mv	1	08/26/19 12:32	MS	ASTM D1498-76M
Solids, Percent	84.9		%	1	08/25/19 14:10	BG	SM2540 G 18TH ED MOD
pH	6.41 J		su	1	08/26/19 12:33	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-DS-MDE	Date Sampled: 08/23/19
Lab Sample ID: JC93833-2R	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	8.2	0.47	mg/kg	1	08/29/19 18:36	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-MC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-3	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 67.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.59	mg/kg	1	08/26/19 18:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	408		mv	1	08/26/19 12:34	MS	ASTM D1498-76M
Solids, Percent	67.3		%	1	08/25/19 14:10	BG	SM2540 G 18TH ED MOD
pH	6.72 J		su	1	08/26/19 12:34	MS	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-MC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-3R	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 67.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.4	0.59	mg/kg	1	08/29/19 18:36	NV	SW846 3066A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: CS-DC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-4	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.45	mg/kg	1	08/26/19 18:21	NV	SW846 3060A/7196A
Redox Potential Vs H2	381		mv	1	08/26/19 12:35	MS	ASTM D1498-76M
Solids, Percent	89.8		%	1	08/25/19 14:10	BG	SM2540 G 18TH ED MOD
pH	7.39 J		su	1	08/26/19 12:35	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-DC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-4R	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2	0.45	mg/kg	1	08/29/19 18:31	NV	SW846 3060A/7196A

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: CS-DC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-4T	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	< 0.20	0.20	%	1	09/09/19 09:00	MP	ASTM D3872-86 R
Sulfide Screen ^b	NEGATIVE			1	09/09/19 09:00	MP	SM4500S2-A-11 R
Total Organic Carbon ^c	1940 J	110	mg/kg	1	09/09/19 09:51	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190823) Lab Sample ID: JC93833-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/19 Date Received: 08/23/19 Percent Solids: n/a
--	---

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/26/19	08/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/26/19	08/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/26/19	08/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/26/19	08/26/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/26/19	08/26/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47347

(2) Prep QC Batch: MP16992

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190823)	Date Sampled: 08/23/19
Lab Sample ID: JC93833-1A	Date Received: 08/23/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/26/19 19:08	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-DS-MDE Lab Sample ID: JC93833-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/19 Date Received: 08/23/19 Percent Solids: 84.9
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 120	120	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium ^a	< 59	59	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	71500	470	mg/kg	100	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 59	59	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	14.1	5.9	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47347

(2) Prep QC Batch: MP16989

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-DS-MDE	Date Sampled: 08/23/19
Lab Sample ID: JC93833-2A	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 59	59	mg/kg	1	08/26/19 23:06	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: CS-MC-F23 Lab Sample ID: JC93833-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/19 Date Received: 08/23/19 Percent Solids: 67.3
---	--

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 150	150	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium ^a	< 73	73	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	74500	580	mg/kg	100	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 73	73	mg/kg	50	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	79.9	7.3	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47347

(2) Prep QC Batch: MP16989

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: CS-MC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-3A	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 67.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 74	74	mg/kg	1	08/26/19 23:11	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: CS-DC-F23 Lab Sample ID: JC93833-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/23/19 Date Received: 08/23/19 Percent Solids: 89.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2	2.2	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium ^a	< 11	11	mg/kg	10	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	467	4.4	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	7.3	5.5	mg/kg	1	08/26/19	08/26/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47347

(2) Prep QC Batch: MP16989

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-DC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-4A	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 89.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 11	11	mg/kg	1	08/26/19 23:21	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: CS-DS-MDE	Date Sampled: 08/23/19
Lab Sample ID: JC93833-2AR	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 84.9
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	5.0	1.2	mg/kg	5	08/30/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²
Thallium	< 0.29	0.29	mg/kg	5	08/30/19	08/30/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47374

(2) Prep QC Batch: MP17076A

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: CS-MC-F23	Date Sampled: 08/23/19
Lab Sample ID: JC93833-3AR	Date Received: 08/23/19
Matrix: SO - Soil	Percent Solids: 67.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	12.6	1.5	mg/kg	5	09/05/19	09/05/19 SN	SW846 6020B ¹	SW846 3050B ²
Thallium	< 0.37	0.37	mg/kg	5	09/05/19	09/05/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47395

(2) Prep QC Batch: MP17153A

RL = Reporting Limit

4.2
4



50
FB

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SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08610
TEL: 732-329-0200 FAX: 732-329-3489/3480
www.sgs.com/ehsusa

E

Client / Reporting Information		Project Information										Requested Analysis							Matrix Codes
Company Name: Arcadis		Project Name: PEG Jersey City Site 107										Total Chromium Total Chromium Hexavalent Chromium Arsenic Nickel Thallium Vanadium							DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 10 Friends Lane		Street: 18 Chapel Ave																	
City, State, Zip: Newtown PA 18940		Billing Information (if different from Report to): City, State, Zip: Jersey City NJ																	
Project Contact: Krista Mastrocels		Company Name: NP000770.0003.1A000																	
Phone #: 610-755-7080		Street Address: NP000770.0003.1A000																	
Sample(s) Name(s): C.C.elli 201-264-8065		City, State, Zip: Jersey City NJ																	
Project Manager: Jim McLaughlin		Attention:																	
SGS Sample #	Field ID / Point of Collection	MEQ/01 Val #	Date	Time	Sampled by	Grab (G) / Composite (C)	Matrix	# of bottles	MC	NICH	HMS	HSD	NONE	DI / WHEAT	MED	ENDURE			
1	FB (20190827)		8/27/19	0700	CC	G	FB	2											
2	BS - D23		8/27/19	0840	CC	G	SO	1											
3	BS - E23		8/27/19	0850	CC	G	SO	1											
4	BS - F23		8/27/19	0900	CC	G	SO	1											
4	BS - E31		8/27/19	0830	CC	G	SO	1											
5	BS - E31		8/27/19	0830	CC	G	SO	1											
Turn Around Time (Business Days)		Deliverable										Comments / Special Instructions							
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other		Approved by (SGS PM) / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										DOD-QSMS NYASP Category B MA MCP Criteria CT RCP Criteria State Forms <input checked="" type="checkbox"/> EDD Format: EQUS							
All data available via Lablink		Approval needed for 1-3 Business Day TA										INITIAL ASSESSMENT 28.89g EDD FORMS 10/1/19							
Sample Custody must be documented below each time sample changes possession, including courier delivery.																			
1	Relinquished by: <i>C.elli</i>	Date / Time: 8/27/19 13:11	Received By: <i>Krista Mastrocels</i>	Date / Time: 8/27/19 17:58	Relinquished by: <i>Jim McLaughlin</i>	Date / Time: 8/27/19	Received By: <i>[Signature]</i>												
3	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:												
5	Relinquished by:	Date / Time:	Received By:	Date / Time:	Relinquished by:	Date / Time:	Received By:												
Custody Seal # 11430		<input type="checkbox"/> Intact <input type="checkbox"/> Not Intact <input checked="" type="checkbox"/> Absent																	

5.2
5



Report of Analysis

Client Sample ID: FB(20190827) Lab Sample ID: JC93950-1 Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/27/19 Date Received: 08/27/19 Percent Solids: n/a
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General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/27/19 23:42	EB	SW846 7196A
Redox Potential Vs H2	336		mv	1	08/28/19 09:45	MS	ASTM D1498-76
pH ^a	4.92		su	1	08/26/19 18:59	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-2	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1 J-	0.47	mg/kg	1	08/29/19 16:11	NV	SW846 3060A/7196A
Redox Potential Vs H2	363		mv	1	08/28/19 10:57	MS	ASTM D1498-76M
Solids, Percent	85.4		%	1	08/28/19 08:25	RC	SM2540 G 18TH ED MOD
pH	6.19		su	1	08/28/19 10:57	MS	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-2R	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.4	0.47	mg/kg	1	09/04/19 16:16	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-2RT		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.50 J	0.20	%	1	09/19/19 12:59	MP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	09/19/19 12:59	MP	SM4500S2-A-11 R
Total Organic Carbon	291000	120	mg/kg	1	09/09/19 16:06	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-3		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.1 J-	0.53	mg/kg	1	08/29/19 16:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	394		mv	1	08/28/19 10:59	MS	ASTM D1498-76M
Solids, Percent	75.1		%	1	08/28/19 08:25	RC	SM2540 G 18TH ED MOD
pH	6.83		su	1	08/28/19 10:57	MS	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: BS-E23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-3R	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.9	0.53	mg/kg	1	09/04/19 16:21	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-4	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	3.5 J-	0.50	mg/kg	1	08/29/19 16:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	314		mv	1	08/28/19 11:01	MS	ASTM D1498-76M
Solids, Percent	80.7		%	1	08/28/19 08:25	RC	SM2540 G 18TH ED MOD
pH	6.88		su	1	08/28/19 11:01	MS	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-4R	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.82	0.50	mg/kg	1	09/04/19 16:21	RI	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: BS-E31	Date Sampled: 08/27/19
Lab Sample ID: JC93950-5	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5 J-	0.48	mg/kg	1	08/29/19 16:19	NV	SW846 3060A/7196A
Redox Potential Vs H2	328		mv	1	08/28/19 11:07	MS	ASTM D1498-76M
Solids, Percent	82.8		%	1	08/28/19 08:25	RC	SM2540 G 18TH ED MOD
pH	7.93		su	1	08/28/19 11:07	MS	SW846 9045D

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: BS-E31	Date Sampled: 08/27/19
Lab Sample ID: JC93950-5R	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66	0.48	mg/kg	1	09/04/19 16:21	RI	SW846 3060A/7196A

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: FB(20190827) Lab Sample ID: JC93950-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 08/27/19 Date Received: 08/27/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47360

(2) Prep QC Batch: MP17044

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190827)	Date Sampled: 08/27/19
Lab Sample ID: JC93950-1A	Date Received: 08/27/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/28/19 16:14	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-2A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium ^a	8.0	6.2	mg/kg	5	08/28/19	08/29/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	65.1	4.9	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium ^a	< 6.2	6.2	mg/kg	5	08/28/19	08/29/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	18.4	6.2	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47360

(2) Prep QC Batch: MP17035

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-2A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 6.7	6.7	mg/kg	1	08/29/19 08:34	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-2AR	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 85.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Thallium	< 0.28	0.28	mg/kg	5	09/03/19	09/04/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47389

(2) Prep QC Batch: MP17127

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-3A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	< 13	13	mg/kg	5	08/28/19	08/29/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	13.6	1.3	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	3700	26	mg/kg	5	08/28/19	08/29/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	35.8	6.5	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47360

(2) Prep QC Batch: MP17035

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-3A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	10.5	1.8	mg/kg	1	08/28/19 15:39	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-3AR		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 75.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.4	1.4	mg/kg	5	09/03/19	09/04/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47389

(2) Prep QC Batch: MP17127

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F23	Date Sampled: 08/27/19
Lab Sample ID: JC93950-4A	Date Received: 08/27/19
Matrix: SO - Soil	Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	12.5	1.3	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	209	5.0	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	16.2	6.3	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47360

(2) Prep QC Batch: MP17035

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-F23		Date Sampled: 08/27/19
Lab Sample ID: JC93950-4A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 80.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	9.0	1.8	mg/kg	1	08/28/19 15:44	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E31		Date Sampled: 08/27/19
Lab Sample ID: JC93950-5A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.4	2.4	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Chromium	23.1	1.2	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Nickel	67.0	4.8	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²
Vanadium	20.4	6.0	mg/kg	1	08/28/19	08/28/19 EAL	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47360

(2) Prep QC Batch: MP17035

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-E31		Date Sampled: 08/27/19
Lab Sample ID: JC93950-5A		Date Received: 08/27/19
Matrix: SO - Soil		Percent Solids: 82.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	21.6	1.7	mg/kg	1	08/28/19 15:49	EAL	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4



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Client / Reporting Information Company Name: Arcadis Street Address: 10 Friends Lane City: Narrows PA 18940 Project Contact: Krista Mastrocola Phone #: 610-755-7080		Project Information Project Name: PPG Jersey City Site 107 Street: 18 Chapel Ave City: Jersey City NJ Project #: NP00070 Client Purchase Order #: 000000000000 Project Manager: Jim McLaughlin		Requested Analysis Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium										Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WIP - Waste FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank			
SSS Sample #	Field ID / Point of Collection	MEQW/ID / Vial #	Date	Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	HD	NOH	HMS	H2SO4	NONE	D / Water	MEDIA	ENCLOSURE	LAB USE ONLY
1	FB(20190829)		8/29/19	0730	CC	G	FB	2									
2	BS-D24		8/29/19	1000	CC	G	SO	1									A35
3	BS-E24		8/29/19	1010	CC	G	SO	1									C31
4	BS-F24		8/29/19	1020	CC	G	SO	1									D36

Turn Around Time (Business Days) _____ Approved By (SGS PM) / Date: _____

Deliverable: Commercial "A" (Level 1) NYASP Category A DOD-QSMS

Commercial "B" (Level 2) NYASP Category B MA MCP Criteria

NJ Reduced (Level 3) Full Tier 1 (Level 4) CT RCP Criteria

Commercial "C" State Forms EDD Format **EQUIS**

NJ DKRP

Commercial "A" = Results only; Commercial "B" = Results + QC Summary; Commercial "C" = Results + QC Summary + Paged Raw data

Approval needed for 1-3 Business Day TAT

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: <i>[Signature]</i>	Date / Time: 8/29/19 1245	Received By: <i>[Signature]</i>	Received Date / Time: 8/29/19	Relinquished by: <i>[Signature]</i>	Date / Time: 8/29/19	Received By: <i>[Signature]</i>	Received Date / Time: 8/29/19
Relinquished by: <i>[Signature]</i>	Date / Time:	Received By: <i>[Signature]</i>	Received Date / Time:	Relinquished by: <i>[Signature]</i>	Date / Time:	Received By: <i>[Signature]</i>	Received Date / Time:
Relinquished by: <i>[Signature]</i>	Date / Time:	Received By: <i>[Signature]</i>	Received Date / Time:	Custody Seal #: 15360	Intact <input type="checkbox"/> / Not intact <input type="checkbox"/>	Preserved when applicable <input type="checkbox"/> / Absent <input checked="" type="checkbox"/>	Therm ID: _____

5.2
5

INITIAL ASSESSMENT **3Box**
LABEL VERIFICATION _____

EHS-A-QAC-0023-02-FORM-Dayton - Standard COC.xlsx



Report of Analysis

Client Sample ID: FB(20190829)	Date Sampled: 08/29/19
Lab Sample ID: JC94114-1	Date Received: 08/29/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	08/29/19 23:21	EB	SW846 7196A
Redox Potential Vs H2	370		mv	1	09/04/19 12:45	MS	ASTM D1498-76
pH ^a	6.28		su	1	08/29/19 18:15	SUB	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-D24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-2	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.4 J-	0.50	mg/kg	1	08/30/19 17:25	NV	SW846 3060A/7196A
Redox Potential Vs H2	378		mv	1	08/31/19 14:18	CM	ASTM D1498-76M
Solids, Percent	79.5		%	1	08/30/19 15:30	JW	SM2540 G 18TH ED MOD
pH	5.13 J		su	1	08/31/19 13:57	CM	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-2R	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.50	mg/kg	1	09/05/19 17:56	NV	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-D24		Date Sampled: 08/29/19
Lab Sample ID: JC94114-2RT		Date Received: 08/29/19
Matrix: SO - Soil		Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	< 0.20	0.20	%	1	09/19/19 12:59	MP	ASTM D3872-86 R
Sulfide Screen ^b	NEGATIVE			1	09/19/19 12:59	MP	SM4500S2-A-11 R
Total Organic Carbon	209000	130	mg/kg	1	09/09/19 15:25	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-E24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-3	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.51	mg/kg	1	08/30/19 17:29	NV	SW846 3060A/7196A
Redox Potential Vs H2	381		mv	1	08/31/19 15:05	CM	ASTM D1498-76M
Solids, Percent	79		%	1	08/30/19 15:30	JW	SM2540 G 18TH ED MOD
pH	7.78 J		su	1	08/31/19 15:05	CM	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-3R	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.1	0.51	mg/kg	1	09/05/19 18:51	NV	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: BS-F24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-4	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.2 J-	0.52	mg/kg	1	08/30/19 17:29	NV	SW846 3060A/7196A
Redox Potential Vs H2	221		mv	1	08/31/19 15:11	CM	ASTM D1498-76M
Solids, Percent	77.2		%	1	08/30/19 15:30	JW	SM2540 G 18TH ED MOD
pH	6.11 J		su	1	08/31/19 15:11	CM	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: BS-F24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-4R	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.4	0.52	mg/kg	1	09/05/19 18:51	NV	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: FB(20190829)		Date Sampled: 08/29/19
Lab Sample ID: JC94114-1A		Date Received: 08/29/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/30/19	08/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	08/30/19	08/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	08/30/19	08/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	08/30/19	08/30/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	08/30/19	08/30/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47376

(2) Prep QC Batch: MP17091

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190829)	Date Sampled: 08/29/19
Lab Sample ID: JC94114-1A	Date Received: 08/29/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	08/30/19 18:29	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: BS-D24		Date Sampled: 08/29/19
Lab Sample ID: JC94114-2A		Date Received: 08/29/19
Matrix: SO - Soil		Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.6	2.6	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ²
Chromium	5.6	1.3	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ²
Nickel	33.2	5.2	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ²
Vanadium	13.5	6.6	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47378

(2) Prep QC Batch: MP17092

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-D24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-2A	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	4.2	1.8	mg/kg	1	08/30/19 19:39	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: BS-E24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-3A	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.5	2.5	mg/kg	1	08/30/19	08/30/19 GT	SW846 6010D ¹	SW846 3050B ²
Chromium	28.3	1.3	mg/kg	1	08/30/19	08/30/19 GT	SW846 6010D ¹	SW846 3050B ²
Nickel	217	5.0	mg/kg	1	08/30/19	08/30/19 GT	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.3	1.3	mg/kg	1	08/30/19	08/30/19 GT	SW846 6010D ¹	SW846 3050B ²
Vanadium	25.7	6.3	mg/kg	1	08/30/19	08/30/19 GT	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47378

(2) Prep QC Batch: MP17092

RL = Reporting Limit

Report of Analysis

Client Sample ID: BS-E24		Date Sampled: 08/29/19
Lab Sample ID: JC94114-3A		Date Received: 08/29/19
Matrix: SO - Soil		Percent Solids: 79.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.7	1.8	mg/kg	1	08/30/19 19:44	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: BS-F24		Date Sampled: 08/29/19
Lab Sample ID: JC94114-4A		Date Received: 08/29/19
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony ^a	7.2	5.3	mg/kg	2	08/30/19	09/04/19	GT SW846 6010D ²	SW846 3050B ³
Chromium	25.2	1.3	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ³
Nickel	7520	53	mg/kg	10	08/30/19	09/04/19	GT SW846 6010D ²	SW846 3050B ³
Thallium ^a	< 2.6	2.6	mg/kg	2	08/30/19	09/04/19	GT SW846 6010D ²	SW846 3050B ³
Vanadium	32.4	6.6	mg/kg	1	08/30/19	08/30/19	GT SW846 6010D ¹	SW846 3050B ³

- (1) Instrument QC Batch: MA47378
- (2) Instrument QC Batch: MA47387
- (3) Prep QC Batch: MP17092

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F24		Date Sampled: 08/29/19
Lab Sample ID: JC94114-4A		Date Received: 08/29/19
Matrix: SO - Soil		Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.0	1.8	mg/kg	1	08/30/19 19:49	GT	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: BS-F24	Date Sampled: 08/29/19
Lab Sample ID: JC94114-4AR	Date Received: 08/29/19
Matrix: SO - Soil	Percent Solids: 77.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	5.0	1.2	mg/kg	5	09/05/19	09/06/19 SN	SW846 6020B ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47407

(2) Prep QC Batch: MP17153A

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC95326

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34470R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC95326 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20190919)	JC95326-1	Water	9/19/2019		X	X	X
SW-A35(8.0-8.5)J8	JC95326-2	Soil	9/19/2019		X	X	X
SW-A36(6.0-6.5)J8	JC95326-3	Soil	9/19/2019		X	X	X
SW-A37(2.0-2.5)J8	JC95326-4	Soil	9/19/2019		X	X	X
SW-A35(8.0-8.5)J16	JC95326-5	Soil	9/19/2019		X	X	X
SW-A36(6.0-6.5)J16	JC95326-6	Soil	9/19/2019		X	X	X
SW-A37(2.0-2.5)J16	JC95326-7	Soil	9/19/2019		X	X	X
SW-A37(8.0-8.5)J16	JC95326-8	Soil	9/19/2019		X	X	X
SW-A41(8.0-8.5)J8	JC95326-9	Soil	9/19/2019		X	X	X
SW-A41(8.0-8.5)J16	JC95326-10	Soil	9/19/2019		X	X	X
SW-A35(8.0-8.5)J8A	JC95326-11	Soil	9/19/2019		X	X	X
SW-A35(8.0-8.5)J8B	JC95326-12	Soil	9/19/2019		X	X	X
SW-A35(8.0-8.5)J16A	JC95326-13	Soil	9/19/2019		X	X	X
SW-A35(8.0-8.5)J16B	JC95326-14	Soil	9/19/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for samples SW-A36(6.0-6.5)J8 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A36(6.0-6.5)J8	Antimony	63.3%	65.8%
SW-A36(6.0-6.5)J16	Antimony	57.1%	58.0%
	Chromium	70.3%	AC (104.3%)

Notes:

AC = Acceptable

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

DATA REVIEW REPORT

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using samples SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16. The MS/MSD recoveries exhibited acceptable RPDs.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A36(6.0-6.5)J8	Hexavalent Chromium, Soluble	< 50%	65.1%
SW-A36(6.0-6.5)J16	Hexavalent Chromium, Soluble	51.0%	AC (82.5)

Notes:

AC = Acceptable

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples associated with preparation batch GP23850 are usable with appropriate qualification. The reanalysis of the field samples associated with preparation batch GP23849 are usable with no qualification of the results required. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 exhibited recoveries within the control limits.

DATA REVIEW REPORT

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory analysis performed on sample locations SW-A36(6.0-6.5)J8 and SW-A36(6.0-6.5)J16 exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD	Reanalysis Laboratory Duplicate RPD
SW-A36(6.0-6.5)J8	Hexavalent Chromium	AC (2.4%)	49.5%
SW-A36(6.0-6.5)J16	Hexavalent Chromium	61.0%	118%

Notes:

AC Acceptable

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result > four times the RL	> 20%	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A35(8.0-8.5)J8 SW-A36(6.0-6.5)J8 SW-A37(2.0-2.5)J8 SW-A35(8.0-8.5)J16 SW-A36(6.0-6.5)J16 SW-A37(2.0-2.5)J16 SW-A37(8.0-8.5)J16 SW-A41(8.0-8.5)J8 SW-A41(8.0-8.5)J16 SW-A35(8.0-8.5)J8A SW-A35(8.0-8.5)J8B SW-A35(8.0-8.5)J16A SW-A35(8.0-8.5)J16B	SW846 9045D	Analysis: 5 days	< 24 hours of receipt by laboratory
SW-A36(6.0-6.5)J8	ASTM D3872-86	Analysis: 18 days	< 24 hours from collection
SW-A36(6.0-6.5)J8	SM4500S2-A	Analysis: 18 days	7 days from collection
SW-A36(6.0-6.5)J8	Lloyd Kahn	Analysis: 18 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

DATA REVIEW REPORT

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample locations FB(20190919), SW-A36(6.0-6.5)J8, and SW-A36(6.0-6.5)J16 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 22, 2019

PEER REVIEW: Dennis Capria

DATE: November 5, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





50
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

E
/ PW

FIELD: EIA Tracking # _____
Sub: Site/Client/Order # _____
SGS Quote # _____
SGS Job # **JC95326**

Client / Reporting Information			Project Information						Requested Analysis										Matrix Codes												
Company Name: Arcadis			Project Name: PPG Jersey City Site 107						Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium CRUSH HOMOGENIZE 2 ALCOHOLS MS/MSD										DW - Drinking Water												
Street Address: 10 Friends Lane			Street: 18 Chapel Ave																GW - Ground Water												
City: Newton PA 18940			City: Jersey City, NJ																WW - Water												
Project Contact: Krista Mastrocola			Project #: NR000770.003.1400																SW - Surface Water												
Phone #: 610-755-7080			Client Purchase Order #:																SO - Soil												
Sampler(s) Name(s): Charles Cofele 2614			Project Manager: Jim McLaughlin						SL - Sludge																						
Field ID / Point of Collection			MEOH/DI Val #		Date		Time		Sampled by		GAS (G) Core (C)		Matrix		# of bottles		PRES		NONE		DI Value		MEOH		ENGLICH		LAB USE ONLY				
1 FB(2019.09.19)					9/19/19		0830		CC G		FB		2				1										AlB				
2 SW-A35(8.0-8.5) J8					9/19/19		1040		CC G		SO		2														C20				
3 SW-A36(6.0-6.5) J8					9/19/19		1050		CC G		SO		2														C5				
4 SW-A37(2.0-2.5) J8					9/19/19		1100		CC G		SO		2																		
5 SW-A37(8.0-8.5) J8					9/19/19		1110		CC G		SO		2																		
6 SW-A35(8.0-8.5) J16					9/19/19		1120		CC G		SO		2																		
7 SW-A36(6.0-6.5) J16					9/19/19		1130		CC G		SO		2																		
8 SW-A37(2.0-2.5) J16					9/19/19		1140		CC G		SO		2																		
9 SW-A37(8.0-8.5) J16					9/19/19		1150		CC G		SO		2																		
10 SW-A41(8.0-8.5) J8					9/19/19		1200		CC G		SO		2																		
11 SW-A41(8.0-8.5) J16					9/19/19		1210		CC G		SO		2																		
Turn Around Time (Business Days)										Deliverable										Comments / Special Instructions											
<input type="checkbox"/> 10 Business Days <input type="checkbox"/> 8 Business Days <input type="checkbox"/> 5 Business Days <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 2 Business Days <input type="checkbox"/> 1 Business Day <input type="checkbox"/> Other _____										<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> NJ Reduced (Level 3) <input type="checkbox"/> Full Tier 1 (Level 4) <input type="checkbox"/> Commercial "C" <input type="checkbox"/> NJ DKQP										<input type="checkbox"/> NYASP Category A <input type="checkbox"/> MA MCP Criteria <input type="checkbox"/> CT RCP Criteria <input type="checkbox"/> State Forms <input checked="" type="checkbox"/> EDD Format EQUS <input type="checkbox"/> DOD-QSM5						* L&S to homogenize all crush samples. ** LAB TO HOMOGENIZE SAMPLE AFTER CRUSHING. *** FOLLOWING HOMOGENIZATION, SAMPLES TO BE SPLIT INTO 2 ALCOHOLS AND ANALYZED. LABEL EACH PRODUCT AS ABB. **** FOLLOWING HOMOGENIZATION, SAMPLES TO BE ANALYZED. http://www.sgs.com/en/terms-and-conditions MS/MSD					
Approved By (SGS PM) / Date: _____										Approval needed for 1-3 Business Day TAT																					
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5.2
5

INITIAL ASSESSMENT **3B (A)**
LABEL VERIFICATION _____

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xls

Report of Analysis

Client Sample ID: FB(20190919)		Date Sampled: 09/19/19
Lab Sample ID: JC95326-1		Date Received: 09/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/19/19 23:09	EB	SW846 7196A
Redox Potential Vs H2	406		mv	1	09/24/19 13:39	JW	ASTM D1498-76
pH ^a	6.10		su	1	09/19/19 20:45	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-2	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6 J-	0.43	mg/kg	1	09/25/19 22:45	EB	SW846 3060A/7196A
Redox Potential Vs H2	343		mv	1	09/24/19 14:29	JW	ASTM D1498-76M
Solids, Percent	93.5		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	6.83 J		su	1	09/24/19 14:29	JW	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-2R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.69	0.43	mg/kg	1	09/30/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-3	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.9 J-	0.44	mg/kg	1	09/25/19 22:37	EB	SW846 3060A/7196A
Redox Potential Vs H2	323		mv	1	09/24/19 14:35	JW	ASTM D1498-76M
Solids, Percent	91.1		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.75 J		su	1	09/24/19 14:35	JW	SW846 9045D

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-3R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.3	0.44	mg/kg	1	09/30/19 15:24	RI	SW846 3060A/7196A

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-3RT	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	10.2 J	0.20	%	1	10/07/19 15:35	UP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/07/19 15:35	UP	SM4500S2-A-11 R
Total Organic Carbon ^c	12600 J	110	mg/kg	1	10/07/19 15:11	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-4	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1 J-	0.42	mg/kg	1	09/25/19 22:45	EB	SW846 3060A/7196A
Redox Potential Vs H2	322		mv	1	09/24/19 14:37	JW	ASTM D1498-76M
Solids, Percent	94.4		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.66 J		su	1	09/24/19 14:37	JW	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-4R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.42	mg/kg	1	09/30/19 15:27	RI	SW846 3060A/7196A

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-5	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	4.2 J-	0.43	mg/kg	1	09/25/19 22:45	EB	SW846 3060A/7196A
Redox Potential Vs H2	337		mv	1	09/24/19 14:40	JW	ASTM D1498-76M
Solids, Percent	93.8		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	6.87 J		su	1	09/24/19 14:40	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-5R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.76	0.43	mg/kg	1	09/30/19 15:27	RI	SW846-3060A/7196A

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-6	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	12.2	0.44	mg/kg	1	09/26/19 15:05	RI	SW846 3060A/7196A
Redox Potential Vs H2	313		mv	1	09/24/19 15:51	JW	ASTM D1498-76M
Solids, Percent	91.6		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	8.06 J		su	1	09/24/19 15:51	JW	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-6R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	6.2 J	0.44	mg/kg	1	09/30/19 16:57	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-7	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	2.6	0.43	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	332		mv	1	09/24/19 14:43	JW	ASTM D1498-76M
Solids, Percent	94		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.65 J		su	1	09/24/19 14:43	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-7R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.43 UJ	0.43	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-8	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.5	0.42	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	304		mv	1	09/24/19 15:55	JW	ASTM D1498-76M
Solids, Percent	96		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	8.13 J		su	1	09/24/19 15:55	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-8R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.16
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ	0.42	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-9	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59	0.45	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	339		mv	1	09/24/19 16:02	JW	ASTM D1498-76M
Solids, Percent	89.2		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.51 J		su	1	09/24/19 15:58	JW	SW846 9045D

RL = Reporting Limit

4.17
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J8		Date Sampled: 09/19/19
Lab Sample ID: JC95326-9R		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.18
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ	0.45	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-10	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44	0.44	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	304		mv	1	09/24/19 15:26	JW	ASTM D1498-76M
Solids, Percent	91.2		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.49 J		su	1	09/24/19 15:26	JW	SW846 9045D

RL = Reporting Limit

4.19
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J16		Date Sampled: 09/19/19
Lab Sample ID: JC95326-10R		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.20
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.44 UJ	0.44	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8A	Date Sampled: 09/19/19
Lab Sample ID: JC95326-11	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.1	0.43	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	311		mv	1	09/24/19 15:31	JW	ASTM D1498-76M
Solids, Percent	93.5		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.24 J		su	1	09/24/19 15:31	JW	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8A		Date Sampled: 09/19/19
Lab Sample ID: JC95326-11R		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.22
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.87 J	0.43	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8B	Date Sampled: 09/19/19
Lab Sample ID: JC95326-12	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.2	0.43	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	319		mv	1	09/24/19 15:36	JW	ASTM D1498-76M
Solids, Percent	94		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.21 J		su	1	09/24/19 15:36	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8B		Date Sampled: 09/19/19
Lab Sample ID: JC95326-12R		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.68 J	0.43	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16A	Date Sampled: 09/19/19
Lab Sample ID: JC95326-13	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.89	0.43	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	328		mv	1	09/24/19 15:39	JW	ASTM D1498-76M
Solids, Percent	94		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	6.96 J		su	1	09/24/19 15:40	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16A	Date Sampled: 09/19/19
Lab Sample ID: JC95326-13R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J	0.43	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.26
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16B	Date Sampled: 09/19/19
Lab Sample ID: JC95326-14	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.9	0.43	mg/kg	1	09/26/19 15:11	RI	SW846 3060A/7196A
Redox Potential Vs H2	335		mv	1	09/24/19 15:47	JW	ASTM D1498-76M
Solids, Percent	93.6		%	1	09/22/19 13:44	BG	SM2540 G 18TH ED MOD
pH	7.03 J		su	1	09/24/19 15:47	JW	SW846 9045D

RL = Reporting Limit

4.27
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16B	Date Sampled: 09/19/19
Lab Sample ID: JC95326-14R	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.75 J	0.43	mg/kg	1	09/30/19 17:03	RI	SW846 3060A/7196A

RL = Reporting Limit

4.28
4

Report of Analysis

Client Sample ID: FB(20190919) Lab Sample ID: JC95326-1A Matrix: AQ - Field Blank Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: n/a
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Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Thallium	< 10	10	ug/l	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47493

(2) Prep QC Batch: MP17441

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190919)		Date Sampled: 09/19/19
Lab Sample ID: JC95326-1A		Date Received: 09/19/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/23/19 16:43	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8 Lab Sample ID: JC95326-2A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 93.5
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.7	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.1	4.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.3	5.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8		Date Sampled: 09/19/19
Lab Sample ID: JC95326-2A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.1	1.5	mg/kg	1	09/23/19 19:09	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J8 Lab Sample ID: JC95326-3A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 91.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	212	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	40.8	4.5	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	40.9	5.7	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J8		Date Sampled: 09/19/19
Lab Sample ID: JC95326-3A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 91.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	199	1.5	mg/kg	1	09/23/19 18:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J8 Lab Sample ID: JC95326-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 94.4
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.3 J-	2.2	mg/kg	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	103	1.1	mg/kg	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	31.4	4.4	mg/kg	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	55.1	5.5	mg/kg	1	09/23/19	09/23/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J8		Date Sampled: 09/19/19
Lab Sample ID: JC95326-4A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 94.4
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	102	1.5	mg/kg	1	09/23/19 19:14	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-5A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	28.8	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.4	4.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	25.8	5.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-5A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.6	1.5	mg/kg	1	09/23/19 19:20	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J16 Lab Sample ID: JC95326-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 91.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/23/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	227 J-	1.1	mg/kg	1	09/23/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	70.0	4.4	mg/kg	1	09/23/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	49.6	5.5	mg/kg	1	09/23/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17456

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A36(6.0-6.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-6A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 91.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	215 221	1.5	mg/kg	1	09/24/19 00:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J16 Lab Sample ID: JC95326-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 94.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	126	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	28.8	4.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	63.5	5.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(2.0-2.5)J16	Date Sampled: 09/19/19
Lab Sample ID: JC95326-7A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	123 126	1.4	mg/kg	1	09/23/19 19:25	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J16 Lab Sample ID: JC95326-8A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 96.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.8	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	26.1	4.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.5	5.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J16		Date Sampled: 09/19/19
Lab Sample ID: JC95326-8A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.8
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.3 25.8	1.4	mg/kg	1	09/23/19 19:30	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-9A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	41.1	1.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	164	4.6	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.2	1.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.7	5.8	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J8	Date Sampled: 09/19/19
Lab Sample ID: JC95326-9A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 89.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	40.5 41.1	1.7	mg/kg	1	09/23/19 19:36	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.9
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J16 Lab Sample ID: JC95326-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 91.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	36.7	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	331	4.5	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	30.8	5.6	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A41(8.0-8.5)J16		Date Sampled: 09/19/19
Lab Sample ID: JC95326-10A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 91.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.3 36.7	1.5	mg/kg	1	09/23/19 19:41	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8A	Date Sampled: 09/19/19
Lab Sample ID: JC95326-11A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	49.9	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	24.1	4.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	30.8	5.4	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8A		Date Sampled: 09/19/19
Lab Sample ID: JC95326-11A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 93.5
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	48.8 49.0	1.5	mg/kg	1	09/23/19 19:56	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8B	Date Sampled: 09/19/19
Lab Sample ID: JC95326-12A	Date Received: 09/19/19
Matrix: SO - Soil	Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	17.5	4.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.0	5.3	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J8B		Date Sampled: 09/19/19
Lab Sample ID: JC95326-12A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.9 23.4	1.5	mg/kg	1	09/23/19 20:01	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16A Lab Sample ID: JC95326-13A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 94.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	29.1	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	15.1	4.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.0	1.0	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.2	5.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16A		Date Sampled: 09/19/19
Lab Sample ID: JC95326-13A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 94.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.13
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.2 27.5	1.4	mg/kg	1	09/23/19 20:07	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16B Lab Sample ID: JC95326-14A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/19/19 Percent Solids: 93.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	24.0	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	13.6	4.4	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Thallium	< 1.1	1.1	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	24.3	5.5	mg/kg	1	09/23/19	09/23/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47495

(2) Prep QC Batch: MP17455

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A35(8.0-8.5)J16B		Date Sampled: 09/19/19
Lab Sample ID: JC95326-14A		Date Received: 09/19/19
Matrix: SO - Soil		Percent Solids: 93.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.14
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.1 23.3	1.5	mg/kg	1	09/23/19 20:12	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

PPG Industries

DATA QUALITY ASSESSMENT

Site 107 Fashionland

Jersey City, New Jersey

Metals, Hexavalent Chromium, and Miscellaneous Analyses

SDG #JC95374

Analyses Performed By:

SGS Accutest

Dayton, New Jersey

Report #34471R

Review Level: Tier III

Project: 30017557.2A000.ANA

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # JC95374 for samples collected in association with the PPG Industries Site 107 Fashionland, Jersey City, New Jersey Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					Cr VI	MET	MISC
FB(20190920)	JC95374-1	Water	9/20/2019		X	X	X
SW-A38(4.0-4.5)J8	JC95374-2	Soil	9/20/2019		X	X	X
SW-A38(4.0-4.5)J16	JC95374-3	Soil	9/20/2019		X	X	X
SW-A38(10.0-10.5)J8	JC95374-4	Soil	9/20/2019		X	X	X
SW-A38(10.0-10.5)J16	JC95374-5	Soil	9/20/2019		X	X	X
SW-A39(6.0-6.5)J8	JC95374-6	Soil	9/20/2019		X	X	X
SW-A39(6.0-6.5)J16	JC95374-7	Soil	9/20/2019		X	X	X
SW-A40(2.0-2.5)J8	JC95374-8	Soil	9/20/2019		X	X	X
SW-A40(2.0-2.5)J16	JC95374-9	Soil	9/20/2019		X	X	X
SW-A40(10.0-10.5)J8	JC95374-10	Soil	9/20/2019		X	X	X
SW-A40(10.0-10.5)J16	JC95374-11	Soil	9/20/2019		X	X	X
SW-A37(8.0-8.5)J8B	JC95374-12	Soil	9/20/2019		X	X	X

Notes:

1. Metals include antimony, chromium, nickel, thallium, and vanadium. Trivalent chromium is reported by calculation (Chromium) – (Hexavalent Chromium).
2. Cr VI is hexavalent chromium.
3. Miscellaneous parameters include pH and redox potential.
4. Miscellaneous parameters for sample SW-A38(4.0-4.5)J8 also include ferrous iron, sulfide screen, and total organic carbon (TOC).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010C, 7196A, and 9045D; Standard Methods (SM) 4500H+B and SM4500S2-A; Lloyd Kahn; and ASTM D1498-76 and D3872-86. Data were reviewed in accordance with USEPA Region 2 SOP HW-2b, Revision 15 (December 2012); New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009); New Jersey Department of Environmental Protection Data Quality Assessment and Data Usability Evaluation Technical Guidance (April 2014); Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM, June 2010); and Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis, June 2018).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

DATA REVIEW REPORT

Two facts should be noted by all data users. First, the “R” flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010C	Water	180 days from collection to analysis	Preserved to a pH of less than 2; Cool to <6°C
	Soil	180 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.998 and all initial calibration verification standard and continuing calibration verification standard recoveries were within control limits of 90% to 110%.

All continuing calibration verification standard recoveries were within the control limit.

3.2 Low-Level Calibration Verification

The low-level initial and continuing calibration check standard serves to verify the linearity of calibration of the analysis at the reporting limit.

All RL standard recoveries were within control limits of 70% to 130% (50% to 150% for antimony and thallium).

DATA REVIEW REPORT

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits of 80% to 120%.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location SW-A39(6.0-6.5)J16 exhibited recoveries within the control limits with the exception of the analytes presented in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SW-A39(6.0-6.5)J16	Antimony	64.1%	64.5%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ-
	Detect	J-
MS/MSD percent recovery < 30%	Non-detect	R
	Detect	J-
MS/MSD percent recovery > 125%	Non-detect	No Action
	Detect	J+

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis using sample SW-A39(6.0-6.5)J16. The MS/MSD recoveries exhibited acceptable RPDs.

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5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 10 times the RL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location SW-A39(6.0-6.5)J16 exhibited %D within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate (LCSD)	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
ICP Serial Dilution %D		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards	X				X
Transcription/calculations acceptable		X		X	
Raw Data	X				X
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

HEXAVALENT CHROMIUM ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7196A	Water	24 hours from collection to analysis	Cool to <6°C
SW-846 3060A/ 7196A	Soil	30 days from collection to extraction; 7 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all calibration verification standard recoveries were within control limits of 90% to 110%.

4. Matrix Spike (MS)/Post-Digestion Spike (PDS)/Laboratory Duplicate Analysis

MS, PDS, and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS Analysis

Soluble and insoluble spike sample analyses are designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The insoluble spike is used to evaluate the dissolution during the digestion process. Hexavalent chromium must exhibit a percent recovery within

DATA REVIEW REPORT

the established acceptance limits of 75% to 125% in both the soluble and insoluble spiked analyses. The control limits do not apply when the parent sample concentration exceeds the spike amount by a factor of four or greater.

The MS analysis performed on sample location SW-A38(4.0-4.5)J8 in association with the insoluble hexavalent chromium analysis exhibited recoveries within the control limits.

The MS analysis performed on sample location SW-A38(4.0-4.5)J8 exhibited spike recoveries less than the lower control limits as presented in the table below.

Sample Location	Analyte	Initial Spike Recovery	Reanalysis Spike Recovery
SW-A38(4.0-4.5)J8	Hexavalent Chromium, Soluble	< 50%	< 50%

The criteria used to evaluate spike recoveries are presented in the following table. The qualifications are applied to all sample results associated with the sample preparation batch. In the event of a recovery outside of the control limits, the MS must be reanalyzed.

Control limit	Sample Result	Qualification ¹
Spike recovery \geq 50% but < 75%	Non-detect	UJ-
	Detect	J-
Spike recovery < 50%	Non-detect	R
	Detect	R
Spike recovery > 125%	Non-detect	No Action
Spike recovery > 125% but \leq 150%	Detect	J+
Spike recovery > 150%	Detect	R

Notes:

¹ If recoveries are < 50% or > 150% for both insoluble and soluble spikes, associated data will be rejected ("R"); otherwise qualify associated data if one of the spikes is outside the < 50% or > 150% limits.

The original analyses of the field samples are usable with appropriate qualification. No sample results were rejected.

4.2 Post-Digestion Spike (PDS) Analysis

The PDS analysis is designed to verify that neither a reducing condition nor a chemical interference is affecting the analysis. This is accomplished by analyzing a second aliquot of the pH-adjusted filtrate that has been spiked with hexavalent chromium. The PDS must exhibit a percent recovery within the method acceptance limits of 85% to 115%.

The PDS analysis performed on sample location SW-A38(4.0-4.5)J8 exhibited recoveries within the control limits.

4.3 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to four times the RL. A control limit of 20% is applied

DATA REVIEW REPORT

when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to four times the RL, a control limit of \pm the RL is used.

The laboratory analysis performed on sample location SW-A38(4.0-4.5)J8 exhibited results within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	Laboratory Duplicate RPD	Reanalysis Laboratory Duplicate RPD
SW-A38(4.0-4.5)J8	Hexavalent Chromium	AC (16.2%)	> \pm RL

Notes:

AC Acceptable

The criteria used to evaluate laboratory duplicate RPD are presented in the following table. In the case of a laboratory duplicate RPD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with the sample preparation batch.

Sample Concentration	Control Limit	Sample Result	Qualification
Parent sample and/or laboratory duplicate sample result < four times the RL	\pm RL	Non-detect	UJ
		Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR HEXAVALENT CHROMIUM

HEXAVALENT CHROMIUM: SW-846 7196A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Spectrophotometer					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Post Digestion Spike %R		X		X	
Field/Lab Duplicate (RPD)		X	X		
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %R Percent recovery
- RPD Relative percent difference
- %RSD Relative percent deviation

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
pH by SM4500H+B	Water	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
pH by SW846 9045D	Soil	QAPP: 24 hours of receipt at laboratory	Cool to <6°C
Oxidation-Reduction Potential by ASTM D1498-76	Water	Not applicable	Cool to <6°C
Oxidation-Reduction Potential (Redox) by ASTM D1498-76	Soil	Measure immediately after creating leachate	Cool to <6°C
Ferrous Iron by ASTM D3872-86	Soil	24 hours from collection to analysis	Cool to <6°C
Sulfide Screen by SM4500S2-A	Soil	7 days from collection to analysis	Cool to <6°C
Total Organic Carbon (TOC) by Lloyd Kahn	Soil	14 days from collection to analysis	Cool to <6°C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Method	Holding Time	Criteria
SW-A38(4.0-4.5)J8 SW-A38(4.0-4.5)J16 SW-A38(10.0-10.5)J8 SW-A38(10.0-10.5)J16 SW-A39(6.0-6.5)J8 SW-A39(6.0-6.5)J16 SW-A40(2.0-2.5)J8 SW-A40(2.0-2.5)J16 SW-A40(10.0-10.5)J8 SW-A40(10.0-10.5)J16 SW-A37(8.0-8.5)J8B	SW846 9045D	Analysis: 5 days	< 24 hours of receipt by laboratory
SW-A38(4.0-4.5)J8	ASTM D3872-86	Analysis: 18 days	< 24 hours from collection
SW-A38(4.0-4.5)J8	SM4500S2-A	Analysis: 18 days	7 days from collection
SW-A38(4.0-4.5)J8	Lloyd Kahn	Analysis: 17 days	14 days from collection

Sample results were qualified as specified in the table below. All other holding times were met.

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Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than two times holding time	J	UJ
Analysis completed greater than two times holding time	J	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Method blank analysis is not applicable for Redox and pH analyses.

Ferrous iron, sulfide, and TOC were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. All buffer check results were within acceptance limits.

4. Laboratory Duplicate Analysis

Laboratory duplicate data are used to assess the precision of the analytical method. The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of \pm the RL is applied.

The laboratory duplicate analysis performed on sample location SW-A38(4.0-4.5)J8 exhibited results within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent

DATA REVIEW REPORT

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate sample was not collected in association with these SDGs.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

LCS results for redox potential, pH, and sulfide screen were not reported in the analytical report.

The LCS analysis performed in association with ferrous iron and TOC exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM4500H+B, SW846 9045D, ASTM D1498-76	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method blanks		X		X	
C. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient	X				X
Continuing calibration %R	X				X
Raw Data		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE: 

DATE: October 23, 2019

PEER REVIEW: Dennis Capria

DATE: November 5, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**





SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08910
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehusa

E

Client / Reporting Information		Project Information		FED-EX Tracking #	Bottle Order Control #											
Company Name: ARCADIS		Project Name: PPG Jersey City Site 107		SGS Quote #	SGS Job # JC95374											
Street Address: 10 Friends Lane		Street: 18 Chapel Ave		Requested Analysis												
City: Newton PA 18940		City: Jersey City NJ		Matrix Codes												
Project Contact: Krista Mastrosob		Product #: 180070.0003.140		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LO - Other Liquid AIR - Air SOL - Other Solid WIP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank												
Phone: 610-755-7080		Client Purchase Order #		LAB USE ONLY												
Sampler's Name(s): CHRISTOPHER CURELL (201) 241-5065		Project Manager: Jim McLaughlin		Total Chromium Trivalent Chromium Hexavalent Chromium Antimony Nickel Thallium Vanadium CRUSH + HOMOGENIZE SAMPLE 2-AUG-19 11:51 AM												
SGS Sample #	Field ID / Point of Collection	MECH/ID / Visit #	Date	Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	MC	NYSP	MA	CT	State	EDD	Form	Comments / Special Instructions
1	FB (2.1-9.2.0)		9/20/19	07:00	CC	G	FB	2								
2	SW-A38(4.1-4.5)J18		9/20/19	09:00	CC	G	SO	1								A18
3	SW-A38(4.1-4.5)J16		9/20/19	09:10	CC	G	SO	1								C9
4	SW-A38(10.0-10.5)J18		9/20/19	09:20	CC	G	SO	1								
5	SW-A38(10.0-10.5)J16		9/20/19	09:30	CC	G	SO	1								
6	SW-A39(6.0-6.5)J18		9/20/19	09:40	CC	G	SO	1								
7	SW-A39(6.0-6.5)J16		9/20/19	09:50	CC	G	SO	1								
8	SW-A40(2.0-2.5)J18		9/20/19	10:00	CC	G	SO	1								
9	SW-A40(2.0-2.5)J16		9/20/19	10:10	CC	G	SO	1								
10	SW-A40(10.0-10.5)J18		9/20/19	10:20	CC	G	SO	1								
11	SW-A40(10.0-10.5)J16		9/20/19	10:30	CC	G	SO	1								
12	SW-A37(8.0-8.5)J18		9/19/19	11:10	CC	G	SO	1								
Turn Around Time (Business Days)		Approved by (SGS PM) / Date:		Deliverable		Commercial "A" (Level 1)		NYASP Category A		DOD-QSMS		Comments / Special Instructions				
<input type="checkbox"/> 10 Business Days						<input type="checkbox"/> Commercial "B" (Level 2)		<input type="checkbox"/> NYASP Category B				*LAB TO CRUSH ENTIRE CR/SR AND HOMOGENIZE SAMPLE				
<input type="checkbox"/> 5 Business Days						<input type="checkbox"/> Commercial "C" (Level 3)		<input type="checkbox"/> MA MCP Criteria				*FOLLOWING HOMOGENIZATION SAMPLE TO BE SPIT INTO 2 ALIQUOTS AND ANALYZED - LABEL EACH ALIQUOT AS ATMS-B.				
<input checked="" type="checkbox"/> 3 Business Days						<input type="checkbox"/> Full Tier I (Level 4)		<input type="checkbox"/> CT RCP Criteria				*FOLLOWING HOMOGENIZATION SAMPLE TO BE ANALYZED AS THE H/HSR				
<input type="checkbox"/> 2 Business Days						<input type="checkbox"/> Commercial "C"		<input type="checkbox"/> State Forms				http://www.sgs.com/en/terms-and-conditions				
<input type="checkbox"/> 1 Business Day						<input type="checkbox"/> NJ DKQP		<input checked="" type="checkbox"/> EDD Format EQ US								
<input type="checkbox"/> Other						Commercial "A" = Results only; Commercial "B" = Results + QC Summary		Commercial "C" = Results + QC Summary + Partial Raw data								
All data available via Lablink		Approval needed for 1-3 Business Day TAT		Sample Custody must be documented below each time samples change possession, including courier delivery.												
Relinquished by: 1	Date / Time: 9/20/19 13:50	Received By: Robert Chambers	Date / Time: 9/20/19 17:08	Relinquished by: 2	Date / Time: 9/20/19 17:08	Received By: 2	Date / Time: 9/20/19 17:08	Relinquished by: 3	Date / Time: 9/20/19 17:08	Received By: 3	Date / Time: 9/20/19 17:08	Relinquished by: 4	Date / Time: 9/20/19 17:08	Received By: 4	Date / Time: 9/20/19 17:08	
Relinquished by: 3	Date / Time: 9/20/19 17:08	Received By: 3	Date / Time: 9/20/19 17:08	Relinquished by: 4	Date / Time: 9/20/19 17:08	Received By: 4	Date / Time: 9/20/19 17:08	Relinquished by: 5	Date / Time: 9/20/19 17:08	Received By: 5	Date / Time: 9/20/19 17:08	Relinquished by: 5	Date / Time: 9/20/19 17:08	Received By: 5	Date / Time: 9/20/19 17:08	
Custody Seal # 10470		Intact <input type="checkbox"/> Not intact <input type="checkbox"/>		Preserved when applicable <input checked="" type="checkbox"/> Absent <input type="checkbox"/>		Therm. ID: 3.20C										

5.2
5

INITIAL ASSESSMENT **JA Dan**
LABEL VERIFICATION



Report of Analysis

Client Sample ID: FB(20190920)	Date Sampled: 09/20/19
Lab Sample ID: JC95374-1	Date Received: 09/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.010	0.010	mg/l	1	09/20/19 23:07	EB	SW846 7196A
Redox Potential Vs H2	423		mv	1	09/24/19 13:50	JW	ASTM D1498-76
pH ^a	6.28		su	1	09/20/19 17:27	DG	SM4500H+ B-11

(a) Sample received out of holding time for pH analysis.

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-2	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85 J-	0.41	mg/kg	1	09/26/19 17:38	NV	SW846 3060A/7196A
Redox Potential Vs H2	390		mv	1	09/25/19 11:24	JW	ASTM D1498-76M
Solids, Percent	97.6		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.54 J		su	1	09/25/19 11:24	JW	SW846 9045D

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-2R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.96	0.41	mg/kg	1	10/04/19 12:49	RI	SW846 3060A/7196A

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-2RT	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Iron, Ferrous ^a	0.84 J	0.20	%	1	10/08/19 12:30	UP	ASTM D3872-86
Sulfide Screen ^b	NEGATIVE			1	10/08/19 12:30	UP	SM4500S2-A-11 R
Total Organic Carbon ^c	29700 J	100	mg/kg	1	10/07/19 23:41	CD	LLOYD KAHN 1988 MOD

- (a) The ferrous iron test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (b) The sulfide screen test was analyzed after completion of Cr6 testing (outside of normal hold times for this parameter) in order to provide more information about the possible impact of the sample matrix on Cr6 recoveries.
- (c) Analysis done out of holding time.

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-3	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41 UJ-	0.41	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	387		mv	1	09/25/19 11:25	JW	ASTM D1498-76M
Solids, Percent	97.6		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.52 J		su	1	09/25/19 11:25	JW	SW846 9045D

RL = Reporting Limit

4.5
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-3R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41	0.41	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.6
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-4	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.58 J-	0.42	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	316		mv	1	09/25/19 11:39	JW	ASTM D1498-76M
Solids, Percent	95.7		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.60 J		su	1	09/25/19 11:39	JW	SW846 9045D

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-4R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.97	0.42	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-5	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	312		mv	1	09/25/19 11:40	JW	ASTM D1498-76M
Solids, Percent	96		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.60 J		su	1	09/25/19 11:40	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-5R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42	0.42	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-6	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.85 J-	0.42	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	309		mv	1	09/25/19 11:42	JW	ASTM D1498-76M
Solids, Percent	96.2		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.62 J		su	1	09/25/19 11:42	JW	SW846 9045D

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-6R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.86	0.42	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-7	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42 UJ-	0.42	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	275		mv	1	09/25/19 11:48	JW	ASTM D1498-76M
Solids, Percent	95.8		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	8.06 J		su	1	09/25/19 11:48	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-7R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.44	0.42	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.14
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-8	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.79 J-	0.41	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	250		mv	1	09/25/19 12:01	JW	ASTM D1498-76M
Solids, Percent	97.8		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	5.68 J		su	1	09/25/19 12:01	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-8R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41	0.41	mg/kg	1	10/04/19 13:00	RI	SW846 3066A/7196A

RL = Reporting Limit

4.16
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-9	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	1.6 J-	0.41	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	262		mv	1	09/25/19 12:04	JW	ASTM D1498-76M
Solids, Percent	97.6		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	5.74 J		su	1	09/25/19 12:04	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-9R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.41	0.41	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-10	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 89.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.45 UJ-	0.45	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	408		mv	1	09/25/19 11:18	JW	ASTM D1498-76M
Solids, Percent	89.1		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	6.59 J		su	1	09/25/19 11:18	JW	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-10R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 89.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.59	0.45	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-11	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.46 UJ-	0.46	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	411		mv	1	09/25/19 11:20	JW	ASTM D1498-76M
Solids, Percent	87.6		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	6.63 J		su	1	09/25/19 11:20	JW	SW846 9045D

RL = Reporting Limit

4.21
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-11R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.54	0.46	mg/kg	1	10/04/19 13:00	RI	SW846 3060A/7196A

RL = Reporting Limit

4.22
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J8B		Date Sampled: 09/19/19
Lab Sample ID: JC95374-12		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	0.66 J-	0.42	mg/kg	1	09/26/19 17:48	NV	SW846 3060A/7196A
Redox Potential Vs H2	401		mv	1	09/25/19 11:22	JW	ASTM D1498-76M
Solids, Percent	96.3		%	1	09/24/19 16:14	BG	SM2540 G 18TH ED MOD
pH	7.59 J		su	1	09/25/19 11:22	JW	SW846 9045D

RL = Reporting Limit

4.23
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J8B	Date Sampled: 09/19/19
Lab Sample ID: JC95374-12R	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent	< 0.42	0.42	mg/kg	1	10/04/19 13:00	RI	SW846-3060A/7196A

RL = Reporting Limit

4.24
4

Report of Analysis

Client Sample ID: FB(20190920)	Date Sampled: 09/20/19
Lab Sample ID: JC95374-1A	Date Received: 09/20/19
Matrix: AQ - Field Blank Soil	Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Chromium	< 10	10	ug/l	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Nickel	< 10	10	ug/l	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3010A ²
Vanadium	< 50	50	ug/l	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3010A ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17481

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: FB(20190920)		Date Sampled: 09/20/19
Lab Sample ID: JC95374-1A		Date Received: 09/20/19
Matrix: AQ - Field Blank Soil		Percent Solids: n/a
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	< 0.020	0.020	mg/l	1	09/24/19 16:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.1
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J8		Date Sampled: 09/20/19
Lab Sample ID: JC95374-2A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	37.0	1.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	29.7	4.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	34.3	5.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.2
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J8		Date Sampled: 09/20/19
Lab Sample ID: JC95374-2A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.2
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	36.2	1.4	mg/kg	1	09/24/19 18:27	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J16		Date Sampled: 09/20/19
Lab Sample ID: JC95374-3A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	29.2	1.1	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	35.8	4.3	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	36.8	5.3	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(4.0-4.5)J16		Date Sampled: 09/20/19
Lab Sample ID: JC95374-3A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.8	1.5	mg/kg	1	09/24/19 18:32	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.3
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J8 Lab Sample ID: JC95374-4A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 95.7
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	26.6	1.0	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	19.2	4.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	35.5	5.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-4A	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.7
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.0	1.4	mg/kg	1	09/24/19 18:37	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.4
4

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J16 Lab Sample ID: JC95374-5A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 96.0
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.4	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	20.4	4.2	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	38.2	5.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A38(10.0-10.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-5A	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.0
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.0	1.5	mg/kg	1	09/24/19 18:42	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J8 Lab Sample ID: JC95374-6A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 96.2
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.1 UJ-	2.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	27.7	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	49.5	4.2	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	34.7	5.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J8	Date Sampled: 09/20/19
Lab Sample ID: JC95374-6A	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 96.2
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

4.6
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	26.9	1.5	mg/kg	1	09/24/19 18:47	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J16 Lab Sample ID: JC95374-7A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 95.8
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	28.7	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	37.7	4.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	32.7	5.4	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A39(6.0-6.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-7A	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 95.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	28.7	1.5	mg/kg	1	09/24/19 18:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.7
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J8		Date Sampled: 09/20/19
Lab Sample ID: JC95374-8A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.0 UJ-	2.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	59.5	1.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	29.2	4.0	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	53.7	5.1	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J8		Date Sampled: 09/20/19
Lab Sample ID: JC95374-8A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.8
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	58.7	1.4	mg/kg	1	09/24/19 18:52	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

4.8
4

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J16		Date Sampled: 09/20/19
Lab Sample ID: JC95374-9A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Chromium	58.3	1.1	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Nickel	31.4	4.3	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²
Vanadium	55.1	5.4	mg/kg	1	09/24/19	09/24/19 ND	SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(2.0-2.5)J16	Date Sampled: 09/20/19
Lab Sample ID: JC95374-9A	Date Received: 09/20/19
Matrix: SO - Soil	Percent Solids: 97.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	56.7	1.5	mg/kg	1	09/24/19 18:57	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J8 Lab Sample ID: JC95374-10A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 89.1
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	23.8	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	78.3	4.5	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	31.2	5.7	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.10
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J8		Date Sampled: 09/20/19
Lab Sample ID: JC95374-10A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 89.1
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.10
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	23.8	1.6	mg/kg	1	09/24/19 19:02	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J16 Lab Sample ID: JC95374-11A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/20/19 Date Received: 09/20/19 Percent Solids: 87.6
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.3 UJ-	2.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	22.8	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	71.2	4.6	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	23.6	5.7	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.11
4

Report of Analysis

Client Sample ID: SW-A40(10.0-10.5)J16		Date Sampled: 09/20/19
Lab Sample ID: JC95374-11A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 87.6
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.11
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	22.8	1.6	mg/kg	1	09/24/19 19:07	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J8B Lab Sample ID: JC95374-12A Matrix: SO - Soil Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ	Date Sampled: 09/19/19 Date Received: 09/20/19 Percent Solids: 96.3
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Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 2.2 UJ-	2.2	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Chromium	25.2	1.1	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Nickel	25.5	4.3	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²
Vanadium	27.7	5.4	mg/kg	1	09/24/19	09/24/19	ND SW846 6010D ¹	SW846 3050B ²

(1) Instrument QC Batch: MA47503

(2) Prep QC Batch: MP17482

RL = Reporting Limit

4.12
4

Report of Analysis

Client Sample ID: SW-A37(8.0-8.5)J8B		Date Sampled: 09/19/19
Lab Sample ID: JC95374-12A		Date Received: 09/20/19
Matrix: SO - Soil		Percent Solids: 96.3
Project: PPG Site 107, 18 Chapel Avenue, Jersey City, NJ		

4.12
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Trivalent ^a	24.5	1.5	mg/kg	1	09/24/19 19:22	ND	SW846 6010/7196A M

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit