

# Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS Accutest, Dayton, NJ	
Laboratory Job No.:	JC19972	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW-846 6010C	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers, Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule /AECOM	Completed on: 06/29/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC19972_2016-06-29_DV Report-F

## Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP and/or Region 2 validation Standard Operating Procedure(s) (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods).
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.
- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in

the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.

R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.

RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on May 10, 2016 as part of the sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-FB20160510 (Equipment Blank)	JC19972-6	Aqueous	Hexavalent Chromium
156-FB20160510 (Equipment Blank)	JC19972-6A	Aqueous	Metals (Sb, Cr, Ni, V, Tl)
156-MW1R-20160510	JC19972-5	Ground Water	Hexavalent Chromium
156-MW1R-20160510	JC19972-5A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW5R-20160510	JC19972-2	Ground Water	Hexavalent Chromium
156-MW5R-20160510	JC19972-2A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW6-20160510	JC19972-3	Ground Water	Hexavalent Chromium
156-MW6-20160510	JC19972-3A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW6D-20160510 (field duplicate of 156-MW6-20160510)	JC19972-4	Ground Water	Hexavalent Chromium
156-MW6D-20160510 (field duplicate of 156-MW6-20160510)	JC19972-4A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW7-20160510	JC19972-1	Ground Water	Hexavalent Chromium
156-MW7-20160510	JC19972-1A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

### MS Results

Sample 156-MW7-20160510 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery

was 93.3%; which met the quality control criteria of 75-125%. No data qualification was required on the basis of spike recovery.

## **Metals**

### **Equipment Blank**

Nickel and vanadium were detected in the equipment blank associated with the samples in this SDG, at a concentration above the MDL, but below the RL.

Nickel was detected at less than three times the EB in samples 156-MW7-20160510, 156-MW5R-20160510, and 156-MW1R-20160510; therefore, the results were negated at the RL.

Vanadium was detected at less than three times the EB in sample 156-MW5R-20160510; therefore, the result was negated at the RL.

Nickel and vanadium were also estimated (J) in additional samples since the concentrations were detected at greater than three times, but less than ten times the EB.

### **Sample Results**

Reported results (flagged B by the laboratory) that were less than the RL, but greater than or equal to the MDL, are approximate values and have been qualified as estimated (J).

### **Data Quality and Usability**

In general, these data appear to be valid and may be used for decision-making purposes. No data were rejected. Qualified results, if applicable, are discussed in attachments A and B below.

Sample results considered to be negated due to blank contamination are usable as nondetect results at the RL.

Sample results reported between the MDL and RL are usable as estimated values.

## **ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

## **Attachment A**

### **Target Analyte Summary Hit List(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 10, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC19972  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB20160510

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW1R-20160510	JC19972-5	CHROMIUM (HEXAVALENT)	U	0.0072B	0.0072	0.010	Qualify	1
156-MW6-20160510	JC19972-3	CHROMIUM (HEXAVALENT)	U	0.0040B	0.0040	0.010	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

A "U" under the Laboratory Sample Result and Validation Sample Result columns indicates a nondetect result at the RL.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 10, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC19972  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB20160510

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW7-20160510	JC19972-1A	CHROMIUM	U	3.1B	3.1	10	Qualify	3
156-MW5R-20160510	JC19972-2A	CHROMIUM	U	1.5B	1.5	10	Qualify	3
156-MW6-20160510	JC19972-3A	CHROMIUM	U	1.7B	1.7	10	Qualify	3
156-MW6D-20160510	JC19972-4A	CHROMIUM	U	1.7B	1.7	10	Qualify	3
156-MW1R-20160510	JC19972-5A	CHROMIUM	U	4.2B	4.2	10	Qualify	3
156-MW7-20160510	JC19972-1A	NICKEL	U	4.1B	U	10	Negate	1
156-MW5R-20160510	JC19972-2A	NICKEL	U	1.3B	U	10	Negate	1
156-MW6-20160510	JC19972-3A	NICKEL	U	18.0	18.0	10		
156-MW6D-20160510	JC19972-4A	NICKEL	U	16.6	16.6	10	Qualify	2
156-MW1R-20160510	JC19972-5A	NICKEL	U	0.90B	U	10	Negate	1,3
156-FB20160510	JC19972-6A	NICKEL	U	1.7B	1.7	10	Qualify	3
156-MW7-20160510	JC19972-1A	VANADIUM	U	7.5B	7.5	50	Qualify	2,3
156-MW5R-20160510	JC19972-2A	VANADIUM	U	1.4B	U	50	Negate	1,3
156-MW6-20160510	JC19972-3A	VANADIUM	U	17.7B	17.7	50	Qualify	3
156-MW6D-20160510	JC19972-4A	VANADIUM	U	16.3B	16.3	50	Qualify	3
156-MW1R-20160510	JC19972-5A	VANADIUM	U	7.8B	7.8	50	Qualify	2,3
156-FB20160510	JC19972-6A	VANADIUM	U	0.80B	0.8	50	Qualify	3

**Note:** A "U" under Method Blank column indicates a nondetect result.

A "U" under the Laboratory Sample Result and Validation Sample Result columns indicates a nondetect result at the RL.

**NJDEP Laboratory Footnote**

1. The value reported is less than or equal to 3x the value in the trip/field blank. It is the policy of NJDEP-DPF SR to negate the reported value as due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte was detected.
2. The value reported is greater than 3x but less than ten (10) the value in the trip/field blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to trip/field blank contamination.
3. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Attachment B**

**Data Validation Report Form**



<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065.20			
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ				<b>Project Manager:</b> Nan Conrey			
<b>Laboratory:</b> SGS Accutest, Dayton, NJ				<b>Type of Validation:</b> Full			
<b>Laboratory Job No:</b> JC19972				<b>Date Checked:</b> 6/27/2016			
<b>Validator:</b> Dawn Brule				<b>Peer:</b> Mary Kozik			
ITEM		YES	NO	N/A	COMMENTS		
Sample results included?		X					
Reporting Limits met project requirements?		X					
Field I.D. included?		X					
Laboratory I.D. included?		X					
Sample matrix included?		X					
Sample receipt temperature 2-6°C?		X			2.7°C		
Signed COCs included?		X					
Date of sample collection included?		X					
Date of sample digestion included?		X					
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)		X					
Date of analysis included?		X					
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)		X					
Method reference included?		X					
Laboratory Case Narrative included?		X					
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.							

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid-level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			
1) Soluble Matrix %R criteria met? (75-125%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?	X			Spiked at 0.15 mg/L
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA for aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	NA for aqueous samples
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			
1) RPD criteria met? (RPD $\leq$ 20%) if both results are $\geq$ 4x RL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>	X			
1) Were Field duplicate RPD criteria met? (RPD $\leq$ 20% for both sample results $>$ 4xRL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.	X			abs diff $<$ RL
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids $>$ 50%?			X	NA for aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD $<$ 20?			X	

**SDG#: JC19972**  
**Batch: GN45633**  
 Cr+6 ICAL 05/10/2016  
 Aqueous  
 (p. 130 of data pkg)

x - concentration	y - response
0	0.001
0.01	0.011
0.05	0.043
0.1	0.098
0.3	0.279
0.5	0.471
0.8	0.749
1	0.94

(p. 130 of data pkg)

AECOM Calculated Intercept	0.0003	OK	Reported intercept	0.0003
AECOM Slope	0.9383	OK	Reported Slope	0.9383
AECOM Calculated r	0.99997	OK	Reported r	0.99997

**LCS calculation** **GN45633-B1 pgs. 126,130**

Background Absorbance	0
Total absorbance	0.141
Total absorbance - background	0.141
Instrument Concentration	0.150
Sample volume (mL)	50
Final Volume (mL)	50
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.15	OK	Reported Result (mg/L)	0.15
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**%R = Found/True\*100** **pgs. 126,130**

True Value (mg/L)	0.15
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AECOM Calculated %R	100.0	OK	Reported %R	100.0
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**MS calculation** **GN45633-S2 (JC19912-1) pgs. 128, 130**

Background reading	0.004
Total absorbance	0.135
Total absorbance - background	0.131
Instrument Concentration	0.1393
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.14	OK, rounding	Reported Result (mg/L)	0.14
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**%R = Found/True\*100** **GN45633-S2 (JC19912-1) pgs. 128, 130**

True Value (mg/L)	0.15
Native concentration (mg/L)	0

AECOM%R	93	OK rounding	Reported %R	93
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**Reporting Limit** **[156-MW7-20160510] (JC19912-1) pgs. 9, 130**

Low Standard	0.01
Initial volume (mL)	50
Final volume (mL)	50
Percent solids	1
Dilution Factor	1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations**

[156-MW7-20160510] (JC19912-1) pgs. 9, 130

Background reading	0.004
Total absorbance	0.004
Total absorbance - background	0
Instrument Response	0.000
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated Result (mg/L)	0.0039U	OK	Reported Result (mg/L)	0.0039U
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<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065	
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ				<b>Project Manager:</b> Nan Conrey	
<b>Laboratory:</b> SGS Accutest, Dayton, NJ				<b>Type of Validation:</b> Full	
<b>Laboratory Job No:</b> JC19972				<b>Date Checked:</b> 6/27/2016	
<b>Validator:</b> Dawn Brule				<b>Peer:</b> Mary Kozik	
ITEM	YES	NO	N/A	COMMENTS	
Sample results included?	X				
Reporting Limits met project requirements?	X				
Field I.D. included?	X				
Laboratory I.D. included?	X				
Did data package sample IDs match sample IDs on COC?	X				
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X				
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X				
Sample matrix included?	X				
Sample receipt temperature 2-6°C?	X			2.7°C	
Signed COCs included?	X				
Date of sample collection included?	X				
Date of sample digestion included?	X				
Date of analysis included?	X				
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X				
Method reference included?	X				
Laboratory Case Narrative included?	X				
<p>Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.</p>					

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?	X			156-MW6-20160510 (2x for TI)
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard? If no, reject (R) data.			X	
3) Hg (7470/7471) -Blank plus 5 standards? If no, reject (R) data.			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89%, and R all data for affected analyte(s) if %R <80% or >120%.			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples? If no, reject (R) data.			X	
2) CCS and CCV from independent source and at mid-level of calibration curve. If no, reject (R) data.			X	
3) %R criteria met? (90-110%R). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89% and R all data for affected analyte(s) if %R <80% or >120%.			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Ti by 6010; 70-130% all others. If no, refer to ILM05.4 NJ SOP 5.A.2 for actions.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples? If no, reject (R) data.			X	

ITEM	YES	NO	N/A	COMMENTS
2) Absolute value <3xIDL? If no, -if sample result <10x CB result, qualify affected analyte(s) in associated samples with CB; -if sample result >10xCB result, no qualification.			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? If no, reject (R) data, except no aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples? If - MB 1/25, J sample results from 21-25; -MB >1/25, R sample results after 25th sample.	X			
3) MB results nondetect? If no, -sample result <3xMB, negate UB; -sample result>3xMB but <10xMB, JB; -sample result >10xMB, no qualification.		X		<mdl
4) Negative MB result reported? If yes, -Positive sample result<10xMB, qualify estimated, biased low (J); -Non-detect sample result, qualify UJ, may be false non-detect.		X		<mdl
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			156-FB20160510
1) FB/EB result non-detect? If no, -sample result <3xMB/EB, negate U; -sample result>3xMB/EB but <10xMB, J; -sample result >10xMB/EB, no qualification.		X		Ni=1.7B ug/l; V=0.80B ug/l
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%) If no, %R>120%, no qualification if sample result non-detect; %R between 121-150%, J positive results, biased high; %R between 50-79%, J/UJ results, biased low; %R<50% or >150%, reject (R) result			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			MS not performed on site sample; batch QC not assessed
1) MS/MSD %R (75-125%R) and RPD (+20%) criteria met? - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; -%R<75% J/UJ for affected analyte(s) for all samples in the same batch/SDG; - RPD outside +20% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	



ITEM	YES	NO	N/A	COMMENTS
3) Was the MS performed on a site sample?			X	
4) Was the MS performed on a FB/EB or TB? If yes, J all sample data.			X	
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R) - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; - %R<75% J/UJ affected analyte(s) for all samples in the same batch/SDG.			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous - If RPD is >20% but <100% and sample and duplicate results are >5x the QL, estimate (J) results >the QL. - If RPD is >100%, reject R results >= the QL. - If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ). - If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	
Soil - If RPD is >35% but <120% and sample and duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R). If no, J/UJ all affected analytes(s) for all samples in the same batch/SDG.	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples? If no, J/UJ affected analyte(s) for all samples in the same batch/SDG.	X			
<b>Serial Dilution</b>	X			Not performed on site sample; batch QC not assessed
1) %D (<10%R) criteria met? - If analyte concentration >25xIDL (7000) or >10xIDL (6010) and %D >10% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was the frequency 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was a site sample used?			X	
4) Was a FB/EB or TB used? If yes, J all sample data.			X	
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>	X			156-MW6-20160510 & 156-MW6D-20160510
<p>Aqueous - If RPD is &gt;20% but &lt;100% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;100%, reject R results &gt;= the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt; the QL, estimate (J) positive results &lt;5x the QL and nondetects (UJ). - If absolute difference is &gt;2x the QL, reject R non-detects and positive results &lt;5x the QL.</p>		X		
<p>Soil - If RPD is &gt;35% but &lt;120% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;120%, reject results &gt; the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt;2x the QL, estimate (J) positive results &lt;5x QL and nondetects (UJ). - If absolute difference is &gt;4x the QL, reject nondetects and positive results &lt;5x QL.</p>			X	
<b>Percent Solids data included in Lab Package?</b>			X	
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

**Blanks**

Equipment Blank	(ug/L)	(ug/L)	(ug/L)		
NICKEL	1.7	5.1	17	<3X EB Negate (U) at RL, <10X EB Estimate (J), or >10x EB (OK)	All samples
VANADIUM	0.80	2.4	8	<3X EB Negate (UB), <10X EB Estimate (J), or >10x EB (OK)	

**Field Duplicate**

Analyte	Sample ID	Result	RL	Dup Lab Sample ID	Dup Result	Dup RL	Unit	RPD	Action
ANTIMONY	156-MW6-20160510	3.3U	6	156-MW6D-0160510	3.3U	6	ug/l	NC	Both ND
CHROMIUM	156-MW6-20160510	1.7B	10	156-MW6D-0160510	1.7B	10	ug/l	0	<20%; ACCEPT
NICKEL	156-MW6-20160510	18.0	10	156-MW6D-0160510	16.6	10	ug/l	8.1	<20%; ACCEPT
THALLIUM	156-MW6-20160510	3.8U	4	156-MW6D-0160510	1.9U	2	ug/l	NC	Both ND
VANADIUM	156-MW6-20160510	17.7B	50	156-MW6D-0160510	16.3B	50	ug/l	8.2	<20%; ACCEPT

## Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS Accutest, Dayton, NJ	
Laboratory Job No.:	JC20458	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW-846 6010C	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers, Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule /AECOM	Completed on: 07/07/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC20458_2016-07-07_DV Report-F

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP and/or Region 2 validation Standard Operating Procedure(s) (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods).
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.
- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in

the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.

R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.

RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on May 17, 2016 as part of the sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
FB-051716 (Equipment Blank)	JC20458-2	Aqueous	Hexavalent Chromium and Metals (Sb, Cr, Ni, V, Tl)
MW-04_051716	JC20458-1	Ground Water	Hexavalent Chromium and Metals (Sb, Cr, Ni, V, Tl)

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

#### MS Results

Sample MW-04\_051716 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery was -2%; which did not meet the quality control criteria of 85-115% and was less than 50%; therefore, the hexavalent chromium results for the samples in this SDG were rejected on the basis of MS %Rs.

### Metals

#### Equipment Blank

Nickel was detected in the equipment blank associated with the samples in this SDG, at a concentration above the MDL, but below the RL.

Nickel was detected at less than three times the EB in sample MW-04\_051716; therefore, the result was negated at the RL.

**Sample Results**

Reported results (flagged B by the laboratory) that were less than the RL, but greater than or equal to the MDL, are approximate values and have been qualified as estimated (J).

**Data Quality and Usability**

The results for hexavalent chromium in both samples were rejected; however, the results may be usable for project objectives as discussed below. Qualified results, if applicable, are presented in Attachments A and B.

Based on the MS recovery, the hexavalent chromium results in both samples in this SDG were rejected (RA). However, based on the reducing potential of the sample matrix shown by the Eh/pH phase diagram there is evidence to suggest that the matrix for this sample was reducing and not capable of supporting hexavalent chromium. Therefore, even though the sample results were rejected based on MS %Rs, these results may be usable for site decisions as estimated values.

Sample results considered to be negated due to blank contamination are usable as nondetect results at the RL.

Sample results reported between the MDL and RL are usable as estimated values.

**ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

## **Attachment A**

### **Target Analyte Summary Hit List(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 17, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC20458  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** FB-051716

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
MW-04_051716	JC20458-1	CHROMIUM (HEXAVALENT)	U	0.017	0.017	0.010	Reject	1
FB-051716	JC20458-2	CHROMIUM (HEXAVALENT)	U	U	U	0.010	Reject	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

A "U" under the Laboratory Sample Result and Validation Sample Result columns indicates a nondetect result at the RL.

**NJDEP Laboratory Footnote**

1. The sample result was rejected because the matrix spike recovery was less than 50%.



**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 17, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC20458  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** FB-051716

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
MW-04_051716	JC20458-1	CHROMIUM	U	1.9B	1.9	10	Qualify	2
MW-04_051716	JC20458-1	NICKEL	U	2.5B	U	10	Negate	1
FB-051716	JC20458-2	NICKEL	U	5.1B	5.1	10	Qualify	2
MW-04_051716	JC20458-1	VANADIUM	U	2.4B	2.4	50	Qualify	2

**Note:** A "U" under Method Blank column indicates a nondetect result.

A "U" under the Laboratory Sample Result and Validation Sample Result columns indicates a nondetect result at the RL.

**NJDEP Laboratory Footnote**

1. The value reported is less than or equal to 3x the value in the trip/field blank. It is the policy of NJDEP-DPFSR to negate the reported value as due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte was detected.
2. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries		<b>Project Number:</b> 60493065.20		
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ		<b>Project Manager:</b> Nan Conrey		
<b>Laboratory:</b> SGS Accutest, Dayton, NJ		<b>Type of Validation:</b> Full		
<b>Laboratory Job No:</b> JC20458		<b>Date Checked:</b> 7/7/2016		
<b>Validator:</b> Dawn Brule		<b>Peer:</b> Mary Kozik		
ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			4.6°C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?	X			
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)	X			
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.				

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid-level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			
1) Soluble Matrix %R criteria met? (75-125%R).		X		See table below.
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?		X		Spiked at 0.15 mg/L
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA for aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	NA for aqueous samples
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC20458-1
1) RPD criteria met? (RPD $\leq$ 20%) if both results are $\leq$ 4x RL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>		X		
1) Were Field duplicate RPD criteria met? (RPD $\leq$ 20% for both sample results $>$ 4xRL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.			X	
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids $>$ 50%?			X	NA for aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD $<$ 20?			X	

**Matrix Spikes**

Sample ID	Analyte	% Recovery	Lower Limit	Upper Limit	Action
MW-04_051716	CHROMIUM (HEXAVALENT)	-2	85	115	Reject (RA)

**SDG#: JC20458**  
**Batch: GN46123**  
 Cr+6 ICAL 05/18/2016  
 Aqueous  
 (p. 122 of data pkg)

x - concentration	y - response
0	0.002
0.01	0.012
0.05	0.047
0.1	0.093
0.3	0.27
0.5	0.459
0.8	0.735
1	0.928

(p. 122 of data pkg)

AECOM Calculated Intercept	-0.0001	OK	Reported intercept	-0.0001
AECOM Slope	0.9226	OK	Reported Slope	0.9226
AECOM Calculated r	0.99994	OK	Reported r	0.99994

**LCS calculation** **GN46123-B1 pgs. 118,122**

Background Absorbance 0  
 Total absorbance 0.135  
 Total absorbance - background 0.135  
 Instrument Concentration 0.146  
 Sample volume (mL) 50  
 Final Volume (mL) 50  
 Dilution Factor 1

AECOM Calculated LCS Result (mg/L)	0.15	OK	Reported Result (mg/L)	0.15
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**%R = Found/True\*100** **pgs. 118,122**

True Value (mg/L) 0.15

AECOM Calculated %R	97.6	OK, rounding	Reported %R	100.0
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**MS calculation** **GN46123-S1 (JC20458-1) pgs. 120, 122**

Background reading 0.015  
 Total absorbance 0.028  
 Total absorbance - background 0.013  
 Instrument Concentration 0.0142  
 Sample volume (mL) 50  
 Final Volume (mL) 50  
 Percent solids 1  
 Dilution Factor 1

AECOM Calculated MS Result (mg/L)	0.014	OK	Reported Result (mg/L)	0.014
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**%R = Found/True\*100** **GN46123-S1 (JC20458-1) pgs. 120, 122**

True Value (mg/L) 0.15  
 Native concentration (mg/L) 0.017

AECOM%R	-2	OK	Reported %R	-2
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**Reporting Limit** **[MW-04\_051716] (JC20458-1) pgs. 9, 122**

Low Standard 0.01  
 Initial volume (mL) 50  
 Final volume (mL) 50  
 Percent solids 1  
 Dilution Factor 1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations**

[MW-04\_051716] (JC20458-1) pgs. 9, 122

Background reading	0.001			
Total absorbance	0.017			
Total absorbance - background	0.016			
Instrument Response	0.017			
Sample volume (mL)	50			
Final Volume (mL)	50			
Percent solids	1			
Dilution Factor	1			
AECOM Calculated Result (mg/L)	0.017	OK	Reported Result (mg/L)	0.017



<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065.20	
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ				<b>Project Manager:</b> Nan Conrey	
<b>Laboratory:</b> SGS Accutest, Dayton, NJ				<b>Type of Validation:</b> Limited	
<b>Laboratory Job No:</b> JC20458				<b>Date Checked:</b> 7/7/2016	
<b>Validator:</b> Dawn Brule				<b>Peer:</b> Mary Kozik	
ITEM	YES	NO	N/A	COMMENTS	
Sample results included?	X				
Reporting Limits met project requirements?	X				
Field I.D. included?	X				
Laboratory I.D. included?	X				
Did data package sample IDs match sample IDs on COC?	X				
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X				
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X				
Sample matrix included?	X				
Sample receipt temperature 2-6°C?	X			4.6°C	
Signed COCs included?	X				
Date of sample collection included?	X				
Date of sample digestion included?	X				
Date of analysis included?	X				
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X				
Method reference included?	X				
Laboratory Case Narrative included?	X				
<p>Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.</p>					

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?		X		
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard? If no, reject (R) data.			X	
3) Hg (7470/7471) -Blank plus 5 standards? If no, reject (R) data.			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89%, and R all data for affected analyte(s) if %R <80% or >120%.			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples? If no, reject (R) data.			X	
2) CCS and CCV from independent source and at mid-level of calibration curve. If no, reject (R) data.			X	
3) %R criteria met? (90-110%R). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89% and R all data for affected analyte(s) if %R <80% or >120%.			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Tl by 6010; 70-130% all others. If no, refer to ILM05.4 NJ SOP 5.A.2 for actions.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples? If no, reject (R) data.			X	

ITEM	YES	NO	N/A	COMMENTS
2) Absolute value <3xIDL? If no, -if sample result <10x CB result, qualify affected analyte(s) in associated samples with CB; -if sample result >10xCB result, no qualification.			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? If no, reject (R) data, except no aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples? If - MB 1/25, J sample results from 21-25; -MB >1/25, R sample results after 25th sample.	X			
3) MB results nondetect? If no, -sample result <3xMB, negate UB; -sample result>3xMB but <10xMB, JB; -sample result >10xMB, no qualification.		X		<mdl; no quals.
4) Negative MB result reported? If yes, -Positive sample result<10xMB, qualify estimated, biased low (J); -Non-detect sample result, qualify UJ, may be false non-detect.	X			<-mdl; no quals.
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			FB-051716
1) FB/EB result non-detect? If no, -sample result <3xFB/EB, negate U; -sample result>3xFB/EB but <10xMB, J; -sample result >10xFB/EB, no qualification.		X		Ni=5.1B ug/l; negate Ni result for samp MW-04_051716
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%) If no, %R>120%, no qualification if sample result non-detect; %R between 121-150%, J positive results, biased high; %R between 50-79%, J/UJ results, biased low; %R<50% or >150%, reject (R) result			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			MS not performed on site sample; batch QC not assessed
1) MS/MSD %R (75-125%R) and RPD (+20%) criteria met? - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; -%R<75% J/UJ for affected analyte(s) for all samples in the same batch/SDG; - RPD outside +20% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was the MS performed on a site sample?			X	
4) Was the MS performed on a FB/EB or TB? If yes, J all sample data.			X	
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R) - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; - %R<75% J/UJ affected analyte(s) for all samples in the same batch/SDG.			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous - If RPD is >20% but <100% and sample and duplicate results are >5x the QL, estimate (J) results >the QL. - If RPD is >100%, reject R results >= the QL. - If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ). - If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	
Soil - If RPD is >35% but <120% and sample and duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R). If no, J/UJ all affected analytes(s) for all samples in the same batch/SDG.	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples? If no, J/UJ affected analyte(s) for all samples in the same batch/SDG.	X			
<b>Serial Dilution</b>	X			Not performed on site sample; batch QC not assessed
1) %D (<10%R) criteria met? - If analyte concentration >25xIDL (7000) or >10xIDL (6010) and %D >10% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was the frequency 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was a site sample used?			X	
4) Was a FB/EB or TB used? If yes, J all sample data.			X	
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>		X		
<p>Aqueous - If RPD is &gt;20% but &lt;100% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;100%, reject R results &gt;= the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt; the QL, estimate (J) positive results &lt;5x the QL and nondetects (UJ). - If absolute difference is &gt;2x the QL, reject R non-detects and positive results &lt;5x the QL.</p>			X	
<p>Soil - If RPD is &gt;35% but &lt;120% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;120%, reject results &gt; the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt;2x the QL, estimate (J) positive results &lt;5x QL and nondetects (UJ). - If absolute difference is &gt;4x the QL, reject nondetects and positive results &lt;5x QL.</p>			X	
<b>Percent Solids data included in Lab Package?</b>			X	
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

**Equipment Blank**

Analyte	(ug/L)	3X EB (ug/L)	10X EB (ug/L)	Action	Associated samples
NICKEL	5.1	15.3	51	<3X EB Negate (U) at RL, <10X EB Estimate (J), or >10x EB (OK)	MW-04_051716

## Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS Accutest, Dayton, NJ	
Laboratory Job No.:	JC22339	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW-846 6010C	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers, Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule /AECOM	Completed on: 07/07/2016; Revised 7/20/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC22339_2016-07-07_DV Report-F

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP and/or Region 2 validation Standard Operating Procedure(s) (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods).
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.

- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.
- R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on June 16, 2016 as part of the PPG Site 156 - Metro Towers sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-FB-20160616 (Equipment Blank)	JC22339-6	Aqueous	Hexavalent Chromium
156-FB-20160616 (Equipment Blank)	JC22339-6A	Aqueous	Metals (Sb, Cr, Ni, V, Tl)
156-MW1R-20160616	JC22339-4	Ground Water	Hexavalent Chromium
156-MW1R-20160616	JC22339-4A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW51R-20160616 (Field Duplicate of 156-MW1R-20160616)	JC22339-5	Ground Water	Hexavalent Chromium
156-MW51R-20160616 (Field Duplicate of 156-MW1R-20160616)	JC22339-5A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW5R-20160616	JC22339-3	Ground Water	Hexavalent Chromium
156-MW5R-20160616	JC22339-3A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW6-20160616	JC22339-1	Ground Water	Hexavalent Chromium
156-MW6-20160616	JC22339-1A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)
156-MW9-20160616	JC22339-2	Ground Water	Hexavalent Chromium
156-MW9-20160616	JC22339-2A	Ground Water	Metals (Sb, Cr, Ni, V, Tl)

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

#### MS Results

Sample 156-MW1R-20160616 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery was 2.7%; which did not meet the quality control criteria of 85-115% and was less than 50%;



therefore, the hexavalent chromium results for all the samples in this SDG were rejected (RA) on the basis of MS %Rs.

## **Metals**

### **ICP Serial Dilution Results**

Sample 156-MW1R-20160616 was selected for the serial dilution. Chromium and nickel each had %differences greater than 10% but because sample results were less than 10x the IDLs, no qualifications were needed. Vanadium had a % difference greater than 10% and a sample result greater than 10x the IDL therefore, all samples with positive results for vanadium were qualified (J) as estimated.

### **Sample Results**

Reported results (flagged B by the laboratory) that were less than the RL, but greater than or equal to the MDL, are approximate values and have been qualified as estimated (J).

### **Data Quality and Usability**

The results for hexavalent chromium in all the samples in this SDG were rejected; however, the results may be usable for project objectives as discussed below. Qualified results are presented in Attachments A and B.

Based on the MS recovery, the hexavalent chromium results in all the samples in this SDG were rejected. However, based on the reducing potential of the sample matrix shown by the Eh/pH phase diagram there is evidence to suggest that the matrix for this sample was reducing and not capable of supporting hexavalent chromium. Therefore, even though the sample results were rejected based on MS %Rs, these results may be usable for site decisions as estimated values.

Sample results qualified due to poor ICP serial dilution results are usable as estimated values with an unknown directional bias.

Sample results reported between the MDL and RL are usable as estimated values.

## **ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

## **Attachment A**

### **Target Analyte Summary Hit List(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** June 16, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC22339  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160616

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW1R-20160616	JC22339-4	CHROMIUM (HEXAVALENT)	U	0.014	0.014	0.010	Reject	1
156-MW51R-20160616	JC22339-5	CHROMIUM (HEXAVALENT)	U	0.014	0.014	0.010	Reject	1
156-MW5R-20160616	JC22339-3	CHROMIUM (HEXAVALENT)	U	U	U	0.010	Reject	1
156-MW6-20160616	JC22339-1	CHROMIUM (HEXAVALENT)	U	0.0054B	0.0054	0.010	Reject	1,2
156-MW9-20160616	JC22339-2	CHROMIUM (HEXAVALENT)	U	0.050	0.050	0.010	Reject	1
156-FB-20160616	JC22339-6	CHROMIUM (HEXAVALENT)	U	U	U	0.010	Reject	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

A "U" under the Laboratory Sample Result and Validation Sample Result columns indicates a nondetect result at the RL.

**NJDEP Laboratory Footnote**

1. The sample result was rejected because the matrix spike recovery was less than 50%.
2. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** June 16, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC22339  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160616

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/kg)	Laboratory Sample Result (mg/kg)	Validation Sample Result (mg/kg)	RL (mg/kg)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW6-20160616	JC22339-1A	CHROMIUM	U	4.0B	4.0	10	Qualify	2
156-MW9-20160616	JC22339-2A	CHROMIUM	U	1.9B	1.9	10	Qualify	2
156-MW5R-20160616	JC22339-3A	CHROMIUM	U	4.8B	4.8	10	Qualify	2
156-MW1R-20160616	JC22339-4A	CHROMIUM	U	4.7B	4.7	10	Qualify	2
156-MW51R-20160616	JC22339-5A	CHROMIUM	U	4.1B	4.1	10	Qualify	2
156-MW6-20160616	JC22339-1A	NICKEL	U	32.5	32.5	10		
156-MW5R-20160616	JC22339-3A	NICKEL	U	2.0B	2.0	10	Qualify	2
156-MW51R-20160616	JC22339-5A	NICKEL	U	1.2B	1.2	10	Qualify	2
156-MW6-20160616	JC22339-1A	VANADIUM	U	18.3B	18.3	50	Qualify	1,2
156-MW9-20160616	JC22339-2A	VANADIUM	U	1.7B	1.7	50	Qualify	1,2
156-MW5R-20160616	JC22339-3A	VANADIUM	U	2.1B	2.1	50	Qualify	1,2
156-MW1R-20160616	JC22339-4A	VANADIUM	U	7.2B	7.2	50	Qualify	1,2
156-MW51R-20160616	JC22339-5A	VANADIUM	U	6.7B	6.7	50	Qualify	1,2

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported value was qualified because serial dilution analysis was not within QC limit of 10% D.
2. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory

**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries		<b>Project Number:</b> 60493065.20		
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ		<b>Project Manager:</b> Nan Conrey		
<b>Laboratory:</b> SGS Accutest, Dayton, NJ		<b>Type of Validation:</b> Full		
<b>Laboratory Job No:</b> JC22339		<b>Date Checked:</b> 7/7/2016		
<b>Validator:</b> Dawn Brule		<b>Peer:</b> Mary Kozik		
ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			Sample listed as 156-MW-6-20160616 on COC, but report and edd listed it as 156-MW6-20160616 which is consistent with IDs of the other samples
Laboratory I.D. included?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			4.3°C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?	X			
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)	X			
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.				

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid-level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			
1) Soluble Matrix %R criteria met? (85-115%R).		X		See table below.
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?		X		Spiked at 0.15 mg/L
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA for aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	



ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	NA for aqueous samples
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC22339-4
1) RPD criteria met? (RPD $\leq$ 20%) if both results are $\geq$ 4x RL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (90-110%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>	X			JC22339-4 & JC22339-5
1) Were Field duplicate RPD criteria met? (RPD $\leq$ 20% for both sample results $>$ 4xRL or absolute difference $\leq$ RL if either or both results are $<$ 4xRL.	X			
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids $>$ 50%?			X	NA for aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD $<$ 20?			X	

**Matrix Spikes**

Sample ID	Analyte	% Recovery	Lower Limit	Upper Limit	Action
156-MW1R-20160616	CHROMIUM (HEXAVALENT)	2.7	85	115	Reject (RA)

**SDG#: JC22339**  
**Batch: GN47627**  
 Cr+6 ICAL 06/16/2016  
 Aqueous  
 (p. 154 of data pkg)

x - concentration	y - response
0	0
0.01	0.009
0.05	0.047
0.1	0.092
0.3	0.27
0.5	0.469
0.8	0.743
1	0.918

(p. 154 of data pkg)

AECOM Calculated Intercept	0.0000	OK	Reported intercept	0.0000
AECOM Slope	0.9232	OK	Reported Slope	0.9232
AECOM Calculated r	0.99991	OK	Reported r	0.99991

**LCS calculation** **GN47627-B2 pgs. 150,154**

Background Absorbance	0
Total absorbance	0.137
Total absorbance - background	0.137
Instrument Concentration	0.148
Sample volume (mL)	50
Final Volume (mL)	50
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.15	OK	Reported Result (mg/L)	0.15
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**%R = Found/True\*100** **pgs. 150,154**

True Value (mg/L)	0.15
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AECOM Calculated %R	98.9	OK, rounding	Reported %R	100.0
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**MS calculation** **GN47627-S3 (JC22339-4) pgs. 152, 154**

Background reading	0.001
Total absorbance	0.018
Total absorbance - background	0.017
Instrument Concentration	0.0184
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.018	OK	Reported Result (mg/L)	0.018
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**%R = Found/True\*100** **GN47627-S3 (JC22339-4) pgs. 152, 154**

True Value (mg/L)	0.15
Native concentration (mg/L)	0.014

AECOM%R	2.9	OK rounding	Reported %R	2.7
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**Reporting Limit** **[156-MW1R-20160616] (JC22339-4) pgs. 16, 154**

Low Standard	0.01
Initial volume (mL)	50
Final volume (mL)	50
Percent solids	1
Dilution Factor	1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations**

[156-MW1R-20160616] (JC22339-4) pgs. 16, 154

Background reading	0.002		
Total absorbance	0.015		
Total absorbance - background	0.013		
Instrument Response	0.014		
Sample volume (mL)	50		
Final Volume (mL)	50		
Percent solids	1		
Dilution Factor	1		
AECOM Calculated Result (mg/L)	0.014	OK	Reported Result (mg/L) 0.014

<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065	
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ				<b>Project Manager:</b> Nan Conrey	
<b>Laboratory:</b> SGS Accutest, Dayton, NJ				<b>Type of Validation:</b> Limited	
<b>Laboratory Job No:</b> JC22339				<b>Date Checked:</b> 7/7/2016	
<b>Validator:</b> Dawn Brule				<b>Peer:</b> Mary Kozik	
ITEM	YES	NO	N/A	COMMENTS	
Sample results included?	X				
Reporting Limits met project requirements?	X				
Field I.D. included?	X				
Laboratory I.D. included?	X				
Did data package sample IDs match sample IDs on COC?		X		Sample listed as 156-MW-6-20160616 on COC, but report and edd listed it as 156-MW6-20160616 which is consistent with IDs of the other samples	
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?		X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X				
Sample matrix included?	X				
Sample receipt temperature 2-6°C?	X			2.7°C	
Signed COCs included?	X				
Date of sample collection included?	X				
Date of sample digestion included?	X				
Date of analysis included?	X				
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X				
Method reference included?	X				
Laboratory Case Narrative included?	X				
<p>Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.</p>					

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?		X		
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard? If no, reject (R) data.			X	
3) Hg (7470/7471) -Blank plus 5 standards? If no, reject (R) data.			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89%, and R all data for affected analyte(s) if %R <80% or >120%.			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples? If no, reject (R) data.			X	
2) CCS and CCV from independent source and at mid-level of calibration curve. If no, reject (R) data.			X	
3) %R criteria met? (90-110%R). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89% and R all data for affected analyte(s) if %R <80% or >120%.			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Tl by 6010; 70-130% all others. If no, refer to ILM05.4 NJ SOP 5.A.2 for actions.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples? If no, reject (R) data.			X	

ITEM	YES	NO	N/A	COMMENTS
2) Absolute value <3xIDL? If no, -if sample result <10x CB result, qualify affected analyte(s) in associated samples with CB; -if sample result >10xCB result, no qualification.			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? If no, reject (R) data, except no aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples? If - MB 1/25, J sample results from 21-25; -MB >1/25, R sample results after 25th sample.	X			
3) MB results nondetect? If no, -sample result <3xMB, negate UB; -sample result>3xMB but <10xMB, JB; -sample result >10xMB, no qualification.		X		<mdl; no quals.
4) Negative MB result reported? If yes, -Positive sample result<10xMB, qualify estimated, biased low (J); -Non-detect sample result, qualify UJ, may be false non-detect.		X		no quals
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			156-FB-20160616
1) FB/EB result non-detect? If no, -sample result <3xFB/EB, negate U; -sample result>3xFB/EB but <10xMB, J; -sample result >10xFB/EB, no qualification.	X			
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%) If no, %R>120%, no qualification if sample result non-detect; %R between 121-150%, J positive results, biased high; %R between 50-79%, J/UJ results, biased low; %R<50% or >150%, reject (R) result			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			JC22339-4A
1) MS/MSD %R (75-125%R) and RPD (+20%) criteria met? - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; -%R<75% J/UJ for affected analyte(s) for all samples in the same batch/SDG; - RPD outside +20% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.	X			
2) Was a sample spiked at the frequency of 1/batch or 20 samples?	X			

ITEM	YES	NO	N/A	COMMENTS
3) Was the MS performed on a site sample?	X			
4) Was the MS performed on a FB/EB or TB? If yes, J all sample data.		X		
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R) - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; - %R<75% J/UJ affected analyte(s) for all samples in the same batch/SDG.			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous - If RPD is >20% but <100% and sample and duplicate results are >5x the QL, estimate (J) results >the QL. - If RPD is >100%, reject R results >= the QL. - If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ). - If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	
Soil - If RPD is >35% but <120% and sample and duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R). If no, J/UJ all affected analytes(s) for all samples in the same batch/SDG.	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples? If no, J/UJ affected analyte(s) for all samples in the same batch/SDG.	X			
<b>Serial Dilution</b>	X			JC22339-4A
1) %D (<10%R) criteria met? - If analyte concentration >25xIDL (7000) or >10xIDL (6010) and %D >10% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.		X		V=15.3%; J positive results
2) Was the frequency 1/batch or 20 samples?	X			



ITEM	YES	NO	N/A	COMMENTS
3) Was a site sample used?	X			
4) Was a FB/EB or TB used? If yes, J all sample data.		X		
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>	X			JC22339-4A & JC22339-5A
Aqueous - If RPD is >20% but <100% and sample and field duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >100%, reject R results >= the QL. - If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ). - If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.	X			Ni: abs diff < RL; no qual.
Soil - If RPD is >35% but <120% and sample and field duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Percent Solids data included in Lab Package?</b>			X	Aqueous samples
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

**ICP Serial Dilution**

JC22339-4A Analyte	Sample (ug/L)	Serial dilution (ug/L)	% Difference	10x IDL (ug/L)	Action
VANADIUM	7.20	8.30	15.3	5	J positive results

## Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS/Accutest, Dayton, NJ	
Laboratory Job No.:	JC24082	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW846-6010	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers , Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule/AECOM Kristin Rutherford/AECOM	Completed on: 07/26/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC24082_2016-07-26_DV Report-FREV

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP validation Standard Operating Procedures (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods);
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015).

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.

- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.
- R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on July 14, 2016 as part of the sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-FB-20160714 (Equipment Blank)	JC24082-2	Aqueous	Hexavalent Chromium and Metals (Sb, Cr, Ni, Ti, V)
156-MW4-20160714	JC24082-1	Ground Water	Hexavalent Chromium and Metals (Sb, Cr, Ni, Ti, V)

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit List(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

Boron, instead of vanadium, was mistakenly requested on the chain of custody (COC). The results for vanadium were retrieved by the laboratory and submitted as a revised data report.

### Hexavalent Chromium

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

### MS Results

Sample 156-MW4-20160714 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery was 97.3%; which met the quality control criteria of 85-115%. No data qualification was required on the basis of spike recovery.

**Metals****Sample Results**

Reported results (flagged B by the laboratory) that were less than the RL, but greater than or equal to the MDL, are approximate values and have been qualified as estimated (J).

**Data Quality and Usability**

In general, these data appear to be valid and may be used for decision-making purposes. No data were rejected. Qualified results, if applicable, are presented in Attachments A and B.

Sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

**ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

## **Attachment A**

### **Target Analyte Summary Hit List(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** July 14, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC24082  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160714

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW4-20160714	JC24082-1	CHROMIUM (HEXAVALENT)	U	0.044	0.044	0.010		

**Note:** A "U" under Method Blank column indicates a nondetect result.

**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** July 14, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC24082  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160714

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW4-20160714	JC24082-1	CHROMIUM	U	1.8B	1.8	10	Qualify	1
156-MW4-20160714	JC24082-1	NICKEL	U	1.4B	1.4	10	Qualify	1
156-MW4-20160714	JC24082-1	VANADIUM	U	2.0B	2.0	50	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.



**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries	<b>Project Number:</b> 60493065.20
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ	<b>Project Manager:</b> Nanette Conrey
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ	<b>Type of Validation:</b> Full
<b>Laboratory Job No:</b> JC24082	<b>Date Checked:</b> 07/21/2016
<b>Validator:</b> Dawn Brule	<b>Peer:</b> Mary Kozik

ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			3.9°C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?	X			
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)	X			
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			

Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid- level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			JC24082-1
1) Soluble Matrix %R criteria met? (85-115%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?		X		As an aqueous sample, the spike concentration was 0.15 mg/l. The data was not affected.
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA – aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	NA for aqueous samples
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC24082-1
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>		X		
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.			X	
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids > 50%?			X	NA -aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD <20?			X	

**SDG#: JC24082**  
**Batch: GN49024**  
 Cr+6 ICAL 07/14/2016  
 Aqueous  
 (p. 194 of data pkg)

x - concentration	y - response
0	0
0.01	0.011
0.05	0.054
0.1	0.1
0.3	0.248
0.5	0.469
0.8	0.741
1	0.909

(p. 194 of data pkg)

AECOM Calculated Intercept	0.0015	OK	Reported intercept	0.0015
AECOM Slope	0.9131	OK	Reported Slope	0.9131
AECOM Calculated r	0.99937	OK	Reported r	0.99937

**LCS calculation** **GN49024-B1 pgs. 190,194**

Background Absorbance	0
Total absorbance	0.135
Total absorbance - background	0.135
Instrument Concentration	0.146
Sample volume (mL)	50
Final Volume (mL)	50
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.15	OK	Reported Result (mg/L)	0.15
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**%R = Found/True\*100** **pgs. 190,194**

True Value (mg/L)	0.15
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AECOM Calculated %R	97.5	OK, rounding	Reported %R	100
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**MS calculation** **GN49024-S1 (JC24082-1) pgs. 192, 194**

Background reading	0
Total absorbance	0.179
Total absorbance - background	0.179
Instrument Concentration	0.1944
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.19	OK	Reported Result (mg/L)	0.19
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**%R = Found/True\*100** **GN49024-S1 (JC24082-1) pgs. 192, 194**

True Value (mg/L)	0.15
Native concentration (mg/L)	0.044

AECOM %R	100	OK rounding	Reported %R	97
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**Reporting Limit** **[156-MW4-20160714] (JC24082-1) pgs. 8, 194**

Low Standard	0.01
Initial volume (mL)	50
Final volume (mL)	50
Percent solids	1
Dilution Factor	1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations****[156-MW4-20160714] (JC24082-1) pgs. 8, 194**

Background reading	0
Total absorbance	0.042
Total absorbance - background	0.042
Instrument Response	0.044
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated Result (mg/L)	0.044	OK	Reported Result (mg/L)	0.044
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<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065.20			
<b>Site Location:</b> PPG Site 156 - Metro Towers				<b>Project Manager:</b> Nanette Conrey			
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ				<b>Type of Validation:</b> Limited			
<b>Laboratory Job No:</b> JC24082				<b>Date Checked:</b> 07/26/2016			
<b>Validator:</b> Dawn Brule, Kristin Rutherford				<b>Peer:</b> Mary Kozik			
ITEM	YES	NO	N/A	COMMENTS			
Sample results included?	X			Note: Boron mistakenly requested on COC instead of Vanadium. Data revised to include V instead of B on 7/25/16.			
Reporting Limits met project requirements?	X						
Field I.D. included?	X						
Laboratory I.D. included?	X						
Did data package sample IDs match sample IDs on COC?	X						
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X						
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X						
Sample matrix included?	X						
Sample receipt temperature 2-6°C?	X			3.9°C			
Signed COCs included?	X						
Date of sample collection included?	X						
Date of sample digestion included?	X						
Date of analysis included?	X						
Holding time met QC criteria?	X						
Method reference included?	X						
Laboratory Case Narrative included?	X						
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.							

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?		X		
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) - plus 1 standard?			X	
3) Cn and Hg -Blank plus 5 standards?			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration?			X	
2) %R criteria met? (90-110%).			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples?			X	
2) CCS and CCV from independent source and at mid-level of calibration curve?			X	
3) %R criteria met? (90-110%R).			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Tl by 6010; 70-130% all others.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples?			X	
2) Absolute value <3xIDL?			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? No aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples?	X			
3) MB results nondetect?		X		<mdl; no quals.
4) Negative MB result reported?	X			<mdl; no quals



ITEM	YES	NO	N/A	COMMENTS
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			
1) FB/EB result non-detect?	X			
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%)			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			JC24082-1
1) MS/MSD %R (75-125%R) and RPD (<20%) criteria met?	X			
2) Was a sample spiked at the frequency of 1/batch or 20 samples?	X			
3) Was the MS performed on a site sample?	X			
4) Was the MS performed on a FB/EB or TB?		X		
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R)			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous – Is RPD ≤ 20%?			X	
Soil – Is RPD ≤ 35%?			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Serial Dilution</b>	X			JC24082-1
1) %D (<10%R) criteria met?		X		Cr, Ni, & V <10x IDL; no quals
2) Was the frequency 1/batch or 20 samples?	X			
3) Was a site sample used?	X			

ITEM	YES	NO	N/A	COMMENTS
4) Was a FB/EB or TB used?		X		
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>		X		
Aqueous - Is RPD is <20%?			X	
Soil - Is RPD is <35%?			X	
<b>Percent Solids data included in Lab Package?</b>			X	Aqueous samples
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

## Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS/Accutest, Dayton, NJ	
Laboratory Job No.:	JC22453	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW846-6010	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers , Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule /AECOM	Completed on: 07/12/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC22453_2016-07-12_DV Report-F

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP validation Standard Operating Procedures (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods);
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.

- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.
- R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on June 17, 2016 as part of the sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-MW10-20160617	JC22453-3	Ground Water	Hexavalent Chromium
156-MW10-20160617	JC22453-3A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW3-20160617	JC22453-2	Ground Water	Hexavalent Chromium
156-MW3-20160617	JC22453-2A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW7-20160617	JC22453-4	Ground Water	Hexavalent Chromium
156-MW7-20160617	JC22453-4A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW8-20160617	JC22453-1	Ground Water	Hexavalent Chromium
156-MW8-20160617	JC22453-1A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

### MS Results

Sample 156-MW10-20160617 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery was 113.3%; which met the quality control criteria of 85-115%. No data qualification was required on the basis of spike recovery.

**Metals**

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

**Data Quality and Usability**

In general, these data appear to be valid and may be used for decision-making purposes. No data were rejected. Qualified results, if applicable, are presented in Attachments A and B.

Sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

**ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

**Attachment A**

**Target Analyte Summary Hitlist(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** June 17, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC22453  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** NA

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW3-20160617	JC22453-2	CHROMIUM (HEXAVALENT)	U	0.0069B	0.0069	0.010	Qualify	1
156-MW8-20160617	JC22453-1	CHROMIUM (HEXAVALENT)	U	0.0058B	0.0058	0.010	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** June 17, 2016  
**Lab Name/ID** Accutest, Dayton, NJ  
**SDG No** JC22453  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** NA

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW8-20160617	JC22453-1A	CHROMIUM	U	730	730	10		
156-MW3-20160617	JC22453-2A	CHROMIUM	U	2.7B	2.7	10	Qualify	1
156-MW10-20160617	JC22453-3A	CHROMIUM	U	5.3B	5.3	10	Qualify	1
156-MW7-20160617	JC22453-4A	CHROMIUM	U	2.0B	2.0	10	Qualify	1
156-MW8-20160617	JC22453-1A	NICKEL	U	3.7B	3.7	10	Qualify	1
156-MW3-20160617	JC22453-2A	NICKEL	U	1.3B	1.3	10	Qualify	1
156-MW10-20160617	JC22453-3A	NICKEL	U	62.7	62.7	10		
156-MW7-20160617	JC22453-4A	NICKEL	U	2.9B	2.9	10	Qualify	1
156-MW3-20160617	JC22453-2A	THALLIUM	U	1.9B	1.9	2.0	Qualify	1
156-MW8-20160617	JC22453-1A	VANADIUM	U	13.2B	13.2	50	Qualify	1
156-MW3-20160617	JC22453-2A	VANADIUM	U	3.4B	3.4	50	Qualify	1
156-MW10-20160617	JC22453-3A	VANADIUM	U	5.2B	5.2	50	Qualify	1
156-MW7-20160617	JC22453-4A	VANADIUM	U	2.1B	2.1	50	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.



**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries	<b>Project Number:</b> 60493065.20
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ	<b>Project Manager:</b> Nanette Conrey
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ	<b>Type of Validation:</b> Full
<b>Laboratory Job No:</b> JC22453	<b>Date Checked:</b> 07/12/2016
<b>Validator:</b> Dawn Brule	<b>Peer:</b> Mary Kozik

ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			5°C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?	X			
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)	X			
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			

Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid- level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			JC22453-3
1) Soluble Matrix %R criteria met? (85-115%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?		X		0.15 mg/l
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA – aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	NA for aqueous samples
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC22453-3
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>		X		
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.			X	
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids > 50%?			X	NA -aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD <20?			X	

**SDG#: JC22453**  
**Batch: GN47687**  
 Cr+6 ICAL 06/17/2016  
 Aqueous  
 (p. 118 of data pkg)

x - concentration	y - response
0	0
0.01	0.01
0.05	0.05
0.1	0.1
0.3	0.29
0.5	0.468
0.8	0.753
1	0.934

(p. 118 of data pkg)

AECOM Calculated Intercept	0.0035	OK	Reported intercept	0.0035
AECOM Slope	0.9336	OK	Reported Slope	0.9336
AECOM Calculated r	0.99995	OK	Reported r	0.99995

**LCS calculation** **GN47687-B1 pgs. 114,118**

Background Absorbance	0
Total absorbance	0.15
Total absorbance - background	0.15
Instrument Concentration	0.157
Sample volume (mL)	50
Final Volume (mL)	50
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.16	OK	Reported Result (mg/L)	0.16
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**%R = Found/True\*100** **pgs. 114,118**

True Value (mg/L)	0.15
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AECOM Calculated %R	104.6	OK, rounding	Reported %R	106.7
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**MS calculation** **GN47687-S3 (JC22453-3) pgs. 116, 118**

Background reading	0.006
Total absorbance	0.167
Total absorbance - background	0.161
Instrument Concentration	0.1687
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.17	OK	Reported Result (mg/L)	0.17
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**%R = Found/True\*100** **GN47687-S3 (JC22453-3) pgs. 116, 118**

True Value (mg/L)	0.15
Native concentration (mg/L)	0

AECOM%R	112.4	OK rounding	Reported %R	113.3
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**Reporting Limit** **[156-MW10-20160617] (JC22453-3) pgs. 13, 118**

Low Standard	0.01
Initial volume (mL)	50
Final volume (mL)	50
Percent solids	1
Dilution Factor	1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations****[156-MW10-20160617] (JC22453-3) pgs. 13, 118**

Background reading	0.006
Total absorbance	0.008
Total absorbance - background	0.002
Instrument Response	-0.002
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated Result (mg/L)	0.0039 U	OK	Reported Result (mg/L)	0.0039 U
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<b>Client Name:</b> PPG Industries		<b>Project Number:</b> 60493065.20			
<b>Site Location:</b> PPG Site 156 - Metro Towers		<b>Project Manager:</b> Nanette Conrey			
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ		<b>Type of Validation:</b> Limited			
<b>Laboratory Job No:</b> JC22453		<b>Date Checked:</b> 07/12/2016			
<b>Validator:</b> Dawn Brule		<b>Peer:</b> Mary Kozik			
ITEM	YES	NO	N/A	COMMENTS	
Sample results included?	X				
Reporting Limits met project requirements?	X				
Field I.D. included?	X				
Laboratory I.D. included?	X				
Did data package sample IDs match sample IDs on COC?	X				
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X				
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X				
Sample matrix included?	X				
Sample receipt temperature 2-6°C?	X			5°C	
Signed COCs included?	X				
Date of sample collection included?	X				
Date of sample digestion included?	X				
Date of analysis included?	X				
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X				
Method reference included?	X				
Laboratory Case Narrative included?	X				
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.					

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?		X		
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard? If no, reject (R) data.			X	
3) Hg (7470/7471) -Blank plus 5 standards? If no, reject (R) data.			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89%, and R all data for affected analyte(s) if %R <80% or >120%.			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples? If no, reject (R) data.			X	
2) CCS and CCV from independent source and at mid- level of calibration curve. If no, reject (R) data.			X	
3) %R criteria met? (90-110%R). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89% and R all data for affected analyte(s) if %R <80% or >120%.			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Tl by 6010; 70-130% all others. If no, refer to ILM05.4 NJ SOP 5.A.2 for actions.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples? If no, reject (R) data.			X	



ITEM	YES	NO	N/A	COMMENTS
2) Absolute value <3xIDL? If no, -if sample result <10x CB result, qualify affected analyte(s) in associated samples with CB; -if sample result >10xCB result, no qualification.			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? If no, reject (R) data, except no aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples? If - MB 1/25, J sample results from 21-25; -MB >1/25, R sample results after 25th sample.	X			
3) MB results nondetect? If no, -sample result <3xMB, negate UB; -sample result >3xMB but <10xMB, JB; -sample result >10xMB, no qualification.		X		<mdl; no quals.
4) Negative MB result reported? If yes, -Positive sample result <10xMB, qualify estimated, biased low (J); -Non-detect sample result, qualify UJ, may be false non-detect.	X			>-mdl; no quals
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>		X		
1) FB/EB result non-detect? If no, -sample result <3xFB/EB, negate U; -sample result >3xFB/EB but <10xMB, J; -sample result >10xFB/EB, no qualification.			X	
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%) If no, %R>120%, no qualification if sample result non-detect; %R between 121-150%, J positive results, biased high; %R between 50-79%, J/UJ results, biased low; %R<50% or >150%, reject ( R) result			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			MS not performed on site sample; batch QC not assessed
1) MS/MSD %R (75-125%R) and RPD (+20%) criteria met? - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; -%R<75% J/UJ for affected analyte(s) for all samples in the same batch/SDG; - RPD outside +20% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was the MS performed on a site sample?			X	
4) Was the MS performed on a FB/EB or TB? If yes, J all sample data.			X	
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R) - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; - %R<75% J/UJ affected analyte(s) for all samples in the same batch/SDG.			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous - If RPD is >20% but <100% and sample and duplicate results are >5x the QL, estimate (J) results >the QL. - If RPD is >100%, reject R results >/= the QL.- If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ).- If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	
Soil - If RPD is >35% but <120% and sample and duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R). If no, J/UJ all affected analytes(s) for all samples in the same batch/SDG.	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples? If no, J/UJ affected analyte(s) for all samples in the same batch/SDG.	X			
<b>Serial Dilution</b>	X			Not performed on site sample; batch QC not assessed.
1) %D (<10%R) criteria met? - If analyte concentration >25xIDL (7000) or >10xIDL (6010) and %D >10% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was the frequency 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was a site sample used?			X	
4) Was a FB/EB or TB used? If yes, J all sample data.			X	
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>		X		
Aqueous - If RPD is >20% but <100% and sample and field duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >100%, reject R results >= the QL. - If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ). - If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	
Soil - If RPD is >35% but <120% and sample and field duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Percent Solids data included in Lab Package?</b>			X	Aqueous samples
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

## Data Validation Report

Project:	PPG Site 156 - Metro Towers	
Laboratory:	SGS/Accutest, Dayton, NJ	
Laboratory Job No.:	JC20060	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196 Metals by ICP-AES/ SW846-6010	
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers , Jersey City, NJ	
AECOM Project No:	60493065.20	
Prepared by:	Dawn Brule /AECOM	Completed on: 06/30/2016
Reviewed by:	Mary Kozik/AECOM	File Name: JC20060_2016-06-30_DV Report-F

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP validation Standard Operating Procedures (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, and USEPA SW-846 Method 7196A;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods);
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.

- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.
- R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on May 11, 2016 as part of the sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-FB-20160511 (Equipment Blank)	JC20060-4	Aqueous	Hexavalent Chromium
156-FB-20160511 (Equipment Blank)	JC20060-4A	Aqueous	Metals (Sb, Cr, Ni, Tl, V)
156-MW10-20160511	JC20060-5	Ground Water	Hexavalent Chromium
156-MW10-20160511	JC20060-5A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW3-20160511	JC20060-1	Ground Water	Hexavalent Chromium
156-MW3-20160511	JC20060-1A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW8-20160511	JC20060-2	Ground Water	Hexavalent Chromium
156-MW8-20160511	JC20060-2A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)
156-MW9-20160511	JC20060-3	Ground Water	Hexavalent Chromium
156-MW9-20160511	JC20060-3A	Ground Water	Metals (Sb, Cr, Ni, Tl, V)

The samples were collected following the procedures detailed in the Work Order for Remedial Action at PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

**MS Results**

Sample 156-MW10-20160511 was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The MS recovery was 86.7%, which met the quality control criteria of 85-115%. No data qualification was required on the basis of spike recoveries.

**Metals**

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

**Data Quality and Usability**

In general, these data appear to be valid and may be used for decision-making purposes. No data were rejected. Qualified results, if applicable, are presented in Attachments A and B.

Sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

**ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

**Attachment A**

**Target Analyte Summary Hitlist(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 11, 2016  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC20060  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160511

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW3-20160511	JC20060-1	CHROMIUM (HEXAVALENT)	U	0.020	0.020	0.010		
156-MW9-20160511	JC20060-3	CHROMIUM (HEXAVALENT)	U	0.031	0.031	0.010		

**Note:** A "U" under Method Blank column indicates a nondetect result.



**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 - Metro Towers  
**Sampling Date** May 11, 2016  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC20060  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20160511

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW10-20160511	JC20060-5A	ANTIMONY	U	5.1B	5.1	6.0	Qualify	1
156-MW8-20160511	JC20060-2A	CHROMIUM	U	472	472	10		
156-MW9-20160511	JC20060-3A	CHROMIUM	U	1.3B	1.3	10	Qualify	1
156-MW10-20160511	JC20060-5A	CHROMIUM	U	42.2	42.2	10		
156-MW3-20160511	JC20060-1A	NICKEL	U	0.80B	0.80	10	Qualify	1
156-MW8-20160511	JC20060-2A	NICKEL	U	4.1B	4.1	10	Qualify	1
156-MW10-20160511	JC20060-5A	NICKEL	U	17.4	17.4	10		
156-MW3-20160511	JC20060-1A	VANADIUM	U	2.6B	2.6	50	Qualify	1
156-MW8-20160511	JC20060-2A	VANADIUM	U	6.8B	6.8	50	Qualify	1
156-MW9-20160511	JC20060-3A	VANADIUM	U	1.5B	1.5	50	Qualify	1
156-MW10-20160511	JC20060-5A	VANADIUM	U	10.9B	10.9	50	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.

**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries	<b>Project Number:</b> 60493065.20
<b>Site Location:</b> PPG Site 156 - Metro Towers, Jersey City, NJ	<b>Project Manager:</b> Nanette Conrey
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ	<b>Type of Validation:</b> Full
<b>Laboratory Job No:</b> JC18700	<b>Date Checked:</b> 06/30/2016
<b>Validator:</b> Dawn Brule	<b>Peer:</b> Mary Kozik

ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			4.2 °C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?	X			
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)	X			
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			

Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid- level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			JC20060-5
1) Soluble Matrix %R criteria met? (75-125%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?	X			0.15 mg/l
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA – aqueous samples
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC20060-5
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.	X			
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>		X		
1) RPD criteria met? (RPD ≤20%) if both results are >4x RL or absolute difference ≤RL if either or both results are <4xRL.			X	
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids > 50%?			X	NA -aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>				
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD <20?			X	

**SDG#: JC20060**  
**Batch: GN45715**  
 Cr+6 ICAL 05/11/2016  
 Aqueous  
 (p. 209 of data pkg)

x - concentration	y - response
0	0.001
0.01	0.01
0.05	0.047
0.1	0.097
0.3	0.281
0.5	0.469
0.8	0.756
1	0.935

(p. 209 of data pkg)

AECOM Calculated Intercept	0.0011	OK	Reported intercept	0.0011
AECOM Slope	0.9373	OK	Reported Slope	0.9373
AECOM Calculated r	0.99998	OK	Reported r	0.99998

**LCS calculation** **GN45715-B1 pgs. 205,209**

Background Absorbance	0
Total absorbance	0.146
Total absorbance - background	0.146
Instrument Concentration	0.155
Sample volume (mL)	50
Final Volume (mL)	50
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.15	OK	Reported Result (mg/L)	0.15
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**%R = Found/True\*100** **pgs. 205,209**

True Value (mg/L)	0.15
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AECOM Calculated %R	103.0	OK, rounding	Reported %R	100.0
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**MS calculation** **GN45715-S3 (JC20060-5) pgs. 207, 209**

Background reading	0.042
Total absorbance	0.169
Total absorbance - background	0.127
Instrument Concentration	0.1343
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.13	OK	Reported Result (mg/L)	0.13
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**%R = Found/True\*100** **GN45715-S3 (JC20060-5) pgs. 207, 209**

True Value (mg/L)	0.15
Native concentration (mg/L)	0

AECOM%R	90	OK rounding	Reported %R	87
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**Reporting Limit** **[156-MW10-20160511] (JC19912-1) pgs. 17, 130**

Low Standard	0.01
Initial volume (mL)	50
Final volume (mL)	50
Percent solids	1
Dilution Factor	1

Reporting Limit (mg/L)	0.010	OK	Reported RL (mg/L)=	0.010
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**Sample Calculations****[156-MW10-20160511] (JC19912-1) pgs. 17, 130**

Background reading	0.044
Total absorbance	0.045
Total absorbance - background	0.001
Instrument Response	0.000
Sample volume (mL)	50
Final Volume (mL)	50
Percent solids	1
Dilution Factor	1

AECOM Calculated Result (mg/L)	0.0039U	OK	Reported Result (mg/L)	0.0039U
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<b>Client Name:</b> PPG Industries				<b>Project Number:</b> 60493065.20			
<b>Site Location:</b> PPG Site 156 - Metro Towers				<b>Project Manager:</b> Nanette Conrey			
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ				<b>Type of Validation:</b> Limited			
<b>Laboratory Job No:</b> JC20060				<b>Date Checked:</b> 06/30/2016			
<b>Validator:</b> Dawn Brule				<b>Peer:</b> Mary Kozik			
ITEM	YES	NO	N/A	COMMENTS			
Sample results included?	X						
Reporting Limits met project requirements?	X						
Field I.D. included?	X						
Laboratory I.D. included?	X						
Did data package sample IDs match sample IDs on COC?	X						
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X						
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X						
Sample matrix included?	X						
Sample receipt temperature 2-6°C?	X			4.2° C			
Signed COCs included?	X						
Date of sample collection included?	X						
Date of sample digestion included?	X						
Date of analysis included?	X						
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X						
Method reference included?	X						
Laboratory Case Narrative included?	X						
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.							



ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?	X			JC20060-1A (2x TI)
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard? If no, reject (R) data.			X	
3) Hg (7470/7471) -Blank plus 5 standards? If no, reject (R) data.			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89%, and R all data for affected analyte(s) if %R <80% or >120%.			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples? If no, reject (R) data.			X	
2) CCS and CCV from independent source and at mid- level of calibration curve. If no, reject (R) data.			X	
3) %R criteria met? (90-110%R). If no, J positive results for affected analyte(s) if %R between 80-89% and 111-120% and indicate bias; UJ non-detect results for affected analyte(s) if %R between 80-89% and R all data for affected analyte(s) if %R <80% or >120%.			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, TI by 6010; 70-130% all others. If no, refer to ILM05.4 NJ SOP 5.A.2 for actions.			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples? If no, reject (R) data.			X	

ITEM	YES	NO	N/A	COMMENTS
2) Absolute value <3xIDL? If no, -if sample result <10x CB result, qualify affected analyte(s) in associated samples with CB; -if sample result >10xCB result, no qualification.			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? If no, reject (R) data, except no aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples? If - MB 1/25, J sample results from 21-25; -MB >1/25, R sample results after 25th sample.	X			
3) MB results nondetect? If no, -sample result <3xMB, negate UB; -sample result>3xMB but <10xMB, JB; -sample result >10xMB, no qualification.	X			<mdl
4) Negative MB result reported? If yes, -Positive sample result<10xMB, qualify estimated, biased low (J); -Non-detect sample result, qualify UJ, may be false non-detect.		X		<-mdl
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			
1) FB/EB result non-detect? If no, -sample result <3xFB/EB, negate U; -sample result>3xFB/EB but <10xMB, J; -sample result >10xFB/EB, no qualification.	X			
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>		X		N/A for Limited Validation
1) Analyzed at beginning of analytical run? If no, reject (R) data.			X	
2) %R criteria met? (80-120%) If no, %R>120%, no qualification if sample result non-detect; %R between 121-150%, J positive results, biased high; %R between 50-79%, J/UJ results, biased low; %R<50% or >150%, reject ( R) result			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			Batch QC. QC not evaluated.
1) MS/MSD %R (75-125%R) and RPD (+20%) criteria met? - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; -%R<75% J/UJ for affected analyte(s) for all samples in the same batch/SDG; - RPD outside +20% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was the MS performed on a site sample?			X	
4) Was the MS performed on a FB/EB or TB? If yes, J all sample data.			X	
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R) - %R>125% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs; - %R<75% J/UJ affected analyte(s) for all samples in the same batch/SDG.			X	
2) Was the spike performed on a FB/EB or TB? If yes, J all sample data.			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		MSD
Aqueous - If RPD is >20% but <100% and sample and duplicate results are >5x the QL, estimate (J) results >the QL. - If RPD is >100%, reject R results >/= the QL.- If sample and/or duplicate is <5x the QL and absolute difference is > the QL, estimate (J) positive results <5x the QL and nondetects (UJ).- If absolute difference is >2x the QL, reject R non-detects and positive results <5x the QL.			X	Batch QC. QC not evaluated.
Soil - If RPD is >35% but <120% and sample and duplicate results are >5x the QL, estimate (J) results > the QL. - If RPD is >120%, reject results > the QL. - If sample and/or duplicate is <5x the QL and absolute difference is >2x the QL, estimate (J) positive results <5x QL and nondetects (UJ). - If absolute difference is >4x the QL, reject nondetects and positive results <5x QL.			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R). If no, J/UJ all affected analytes(s) for all samples in the same batch/SDG.	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples? If no, J/UJ affected analyte(s) for all samples in the same batch/SDG.	X			
<b>Serial Dilution</b>	X			Batch QC. QC not evaluated.
1) %D (<10%R) criteria met? - If analyte concentration >25xIDL (7000) or >10xIDL (6010) and %D >10% J positive results for affected analyte(s) for all samples in the same batch/SDG, accept NDs.			X	
2) Was the frequency 1/batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was a site sample used?		X		
4) Was a FB/EB or TB used? If yes, J all sample data.			X	
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>		X		
<p>Aqueous - If RPD is &gt;20% but &lt;100% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;100%, reject R results &gt;= the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt; the QL, estimate (J) positive results &lt;5x the QL and nondetects (UJ). - If absolute difference is &gt;2x the QL, reject R non-detects and positive results &lt;5x the QL.</p>			X	
<p>Soil - If RPD is &gt;35% but &lt;120% and sample and field duplicate results are &gt;5x the QL, estimate (J) results &gt; the QL. - If RPD is &gt;120%, reject results &gt; the QL. - If sample and/or duplicate is &lt;5x the QL and absolute difference is &gt;2x the QL, estimate (J) positive results &lt;5x QL and nondetects (UJ). - If absolute difference is &gt;4x the QL, reject nondetects and positive results &lt;5x QL.</p>			X	
<b>Percent Solids data included in Lab Package?</b>			X	Aqueous samples
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	

# Data Validation Report

Project:	PPG Site 156 – Metro Towers 2017 Supplemental RI	
Laboratory:	SGS/Accutest, Dayton, NJ	
Laboratory Job No.:	JC55900	
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196A CCPW Metals SW846 6010	
Validation Level:	Full (Hexavalent Chromium) Limited (CCPW Metals)	
Site Location/Address:	PPG Site 156 - Metro Towers, Jersey City, NJ	
AECOM Project No:	60493065.22	
Prepared by:	Sharon McKechnie /AECOM	Completed on: 01/04/2018
Reviewed by:	Mary Kozik/AECOM	File Name: JC55900_2018-01-04_DVReport-F

**Introduction**

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP validation Standard Operating Procedure(s) (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium for USEPA SW-846 Method 3060A, USEPA SW-846 Method 7196A;
- ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015).

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.
- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.

R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.

RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on November 21, 2017 as part of the 2017 Supplemental RI sampling at PPG Site 156 - Metro Towers, Jersey City, NJ. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction*
156-FB-20171121 (Equipment Blank)	JC55900-4	Aqueous	Hexavalent Chromium
156-FB-20171121 (Equipment Blank)	JC55900-4A	Aqueous	CCPW Metals
156-MW8A-20171121	JC55900-1	Ground Water	Hexavalent Chromium
156-MW8A-20171121	JC55900-1A	Ground Water	CCPW Metals
156-MW8A-20171121X (Field Duplicate of 156-MW8A-20171121)	JC55900-2	Ground Water	Hexavalent Chromium
156-MW8A-20171121X (Field Duplicate of 156-MW8A-20171121)	JC55900-2A	Ground Water	CCPW Metals
156-MW8B-20171121	JC55900-3	Ground Water	Hexavalent Chromium
156-MW8B-20171121	JC55900-3A	Ground Water	CCPW Metals
*CCPW Metals: Antimony, Chromium, Nickel, Thallium, Vanadium			

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers, Jersey City, NJ and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The Eh/pH diagram included in the original issue of the laboratory data package was incomplete. A revised report was issued on 1/4/2018 with a complete Eh/pH diagram.

Quality control (QC) issues identified during validation are discussed below. Refer to the Soil Target Analyte Summary Hit List(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

#### MS Results

Sample 156-MW8A-20171121 was selected for the matrix spike (MS) analysis and used for supporting data quality recommendations. The soluble MS recovery was 106.7%, which met the quality control (QC) criteria of 85-115%R. Therefore, all hexavalent chromium results were accepted without qualification.

All the samples were tested for pH and oxidation reduction potential (ORP) and plotted on an Eh/pH phase diagram. From this diagram, the source sample for the matrix spike analysis was plotted below the phase change line, indicating a reducing potential within the sample matrix incapable of supporting hexavalent chromium.

**CCPW Metals****Equipment Blanks**

Nickel was detected in the equipment blank (EB) associated with the soil samples in this data set, at a concentration above the method detection limit (MDL), but below the reporting limit (RL). Nickel was detected in samples 156-MW8A-20171121 and 156-MW8A-20171121X at a concentration greater than three but less than ten times the EB concentration; therefore, the nickel results in both samples were qualified as estimated (J).

**Sample Results**

Reported results (flagged B by the laboratory) that were less than the RL, but greater than or equal to the MDL, are approximate values and have been qualified as estimated (J).

**Data Quality and Usability**

In general, all data appear to be valid and may be used for decision-making purposes. Qualified and detected results are presented in Attachments A and B.

All hexavalent chromium results were accepted without qualification.

The nickel results in samples 156-MW8A-20171121 and 156-MW8A-20171121X were qualified as estimated due to equipment blank contamination.

Sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

**ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form

## **Attachment A**

### **Target Analyte Summary Hit List(s)**



**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 – Metro Towers 2017 Supplemental RI  
**Sampling Date** November 21, 2017  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC55900  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20171121

**No positive results and no qualified nondetects**

**Aqueous Target Analyte Summary Hit List (Metals)**

**Site Name** PPG Site 156 – Metro Towers 2017 Supplemental RI  
**Sampling Date** November 21, 2017  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC55900  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20171121

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-FB-20171121	JC55900-4A	NICKEL	U	1.3B	1.3J	10	Qualify	2
156-MW8A-20171121	JC55900-1A	CHROMIUM	U	0.90B	0.90J	10	Qualify	2
156-MW8A-20171121	JC55900-1A	NICKEL	U	10.6	10.6J	10	Qualify	1
156-MW8A-20171121	JC55900-1A	VANADIUM	U	1.7B	1.7J	50	Qualify	2
156-MW8A-20171121X	JC55900-2A	CHROMIUM	U	1.4B	1.4J	10	Qualify	2
156-MW8A-20171121X	JC55900-2A	NICKEL	U	10.9	10.9J	10	Qualify	1
156-MW8A-20171121X	JC55900-2A	VANADIUM	U	2.5B	2.5J	50	Qualify	2
156-MW8B-20171121	JC55900-3A	CHROMIUM	U	1.9B	1.9J	10	Qualify	2
156-MW8B-20171121	JC55900-3A	VANADIUM	U	22.8B	22.8J	50	Qualify	2

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The value reported is greater than three (3) times but less than ten (10) times the value in the trip/field blanks and is considered "real". However, the reported value must be quantitatively qualified "J" due to trip/field blank contamination.
2. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated.

**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries	<b>Project Number:</b> 60493065
<b>Site Location:</b> PPG Site 156 – Metro Towers 2017 Supplemental RI Jersey City, NJ	<b>Project Manager:</b> Bill Spronz
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ	<b>Type of Validation:</b> Full
<b>Laboratory Job No:</b> JC55900	<b>Date Checked:</b> 01/04/18
<b>Validator:</b> Sharon McKechnie	<b>Peer:</b> Mary Kozik

ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6°C?	X			
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?			X	Aqueous samples
Holding time to digestion met criteria?			X	Aqueous samples
Date of analysis included?	X			
Holding time to analysis met criteria?	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			

Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of >0.995 (7196A) or >0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid- level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.	X			
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?		X*		* See memo
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			JC55900-1, soluble %R 106.7%. No table.
1) Soluble Matrix %R criteria met? (85-115%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	As an aqueous sample, JC55900-1 was spiked at 0.150 mg/l. The data were not affected.
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	NA for aqueous samples
1) Insoluble Matrix %R criteria met? (85-115%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
<b>Post Spike</b>		X		None reported
1) Post Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	

ITEM	YES	NO	N/A	COMMENTS
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC55900-1
1) RPD criteria met? (RPD ≤ 20%) if both results are ≥4x RL or absolute difference ±RL if either or both results are <4xRL	X			Sample and duplicate all nondetect. No table.
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>	X			156-MW8A-20171121/156-MW8A-20171121X
1) Were Field duplicate RPD criteria met? (RPD ≤ 20% if both sample results ≥4xR, or absolute difference ±RL if either or both results are <4xRL.	X			Both ND, OK. No table
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids > 50%?			X	NA aqueous samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>	X			
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the RPD ≤ 20?			X	
Total Chromium concentration > hexavalent chromium in associated samples?	X			All OK, no table.

**SDG#: JC55900, Method 7196**

**Batch: GN72970**

Cr+6 ICAL - 11/21/2017

Groundwater

(p 319 of data pkg)

x - concentration	y - response
0	0
0.01	0.008
0.05	0.047
0.1	0.097
0.3	0.257
0.5	0.461
0.8	0.728
1	0.925

(p 319 of data pkg)

AECOM Calculated Intercept	-0.0019	OK	Reported intercept	-0.0019
AECOM Slope	0.9195	OK	Reported Slope	0.9195
AECOM Calculated r	0.99975	OK	Reported r	0.99975

**LCS calculation**

**GN72970-B1 P.315,319**

Background absorbance	0
Sample absorbance	0.142
LCS Soluble Instrument Response	0.142
Instrument Concentration (mg/L)	0.156

NA: standards and samples treated the same

Sample aliquot	0.05
Final volume	0.05
Dilution Factor	1

AECOM Calculated LCS Result (mg/L)	0.16	OK	Reported Result (mg/L)	0.16
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**%R = Found/True\*100**

**GN72970-B1 P.315,319**

True Value (mg/L)	0.15
-------------------	------

Reported in raw data as 104% p.320

AECOM Calculated %R	104	OK	Reported %R	106.7
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**MS calculation**

**GN72970-S1 P.317,319 JC55900-1**

Background reading	0.003
Total absorbance	0.146
Total absorbance - background	0.143
Instrument Concentration (mg/L)	0.1575

NA: standards and samples treated the same

Sample aliquot	0.05
Final volume	0.05
Dilution Factor	1

AECOM Calculated MS Result (mg/L)	0.16	OK	Reported Result (mg/L)	0.16
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**%R = Found/True\*100**

**GN72970-S1 P.317,319 JC55900-1**

True Value (mg/L)	0.150
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Native concentration (mg/L)	0.000
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AECOM Calculated MS Result %R	105.0		Reported %R	106.7
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Reporting Limit	JC55900-1	P.15	156-MW8A-20171121
Low Standard	0.01		
Initial volume (L)	0.05	NA: standards and samples treated the same	
Final volume (L)	0.05		
Dilution Factor	1		
AECOM Calculated Reporting Limit	0.010	OK	Reported RL (mg/L)= 0.010

Sample Calculations	JC55900-1	P.8,319	156-MW8A-20171121
Background reading	0.003		
Total absorbance	0.004		
Total absorbance - background	0.001		
Instrument Response (mg/L)	0.003		
Sample volume (L)	0.05	NA: standards and samples treated the same	
Final Volume (L)	0.05		
Dilution Factor	1		
AECOM Calculated Result (mg/L)	0.003	OK, Reported as Nondetect	Reported Result (mg/L) 0.0081 U



<b>Client Name:</b> PPG Industries		<b>Project Number:</b> 60493065			
<b>Site Location:</b> PPG Site 156 – Metro Towers 2017 Supplemental RI Jersey City, NJ		<b>Project Manager:</b> Bill Spronz			
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ		<b>Type of Validation:</b> Limited			
<b>Laboratory Job No:</b> JC55900		<b>Date Checked:</b> 01/04/2018			
<b>Validator:</b> Sharon McKechnie		<b>Peer:</b> Mary Kozik			
ITEM	YES	NO	N/A	COMMENTS	
Sample results included?	X				
Reporting Limits met project requirements?	X				
Field I.D. included?	X				
Laboratory I.D. included?	X				
Did data package sample IDs match sample IDs on COC?	X				
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X				
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X				
Sample matrix included?	X				
Sample receipt temperature 2-6°C?	X				
Signed COCs included?	X				
Date of sample collection included?	X				
Date of sample digestion included?			X	Aqueous samples	
Date of analysis included?	X				
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X				
Method reference included?	X				
Laboratory Case Narrative included?	X				
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.					

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?	X			Up to 5X
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) -Blank plus 1 standard?			X	
3) Hg (7470/7471) -Blank plus 5 standards			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration? If no, reject (R) data.			X	
2) %R criteria met? (90-110%).			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples?			X	
2) CCS and CCV from independent source and at mid- level of calibration curve.			X	
3) %R criteria met? (90-110%R).			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	N/A for Limited Validation
1) %R criteria met? -			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples?			X	
2) Absolute value <3xIDL?			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples?	X			
2) Method blank analyzed 1/20 samples?	X			
3) MB results nondetect?	X			
4) Negative MB result reported?		X		

ITEM	YES	NO	N/A	COMMENTS
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			
1) FB/EB result non-detect?		X		See table
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run?			X	
2) %R criteria met? (80-120			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			JC55900-1A
1) MS/MSD %R (75-125%R) and RPD (20%) criteria met?	X			
2) Was a sample spiked at the frequency of 1/batch or 20 samples?	X			
3) Was the MS performed on a site sample?	X			
4) Was the MS performed on a FB/EB or TB?		X		
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R)			X	
2) Was the spike performed on a FB/EB or TB?			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous – Is RPD ≤ 20%?			X	
Soil – Is RPD ≤ 35%?			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Serial Dilution</b>			X	N/A for Limited Validation
1) %D (<10%R) criteria met? -			X	
2) Was the frequency 1/batch or 20 samples?			X	
3) Was a site sample used?			X	
4) Was a FB/EB or TB used?			X	

ITEM	YES	NO	N/A	COMMENTS
5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>	X			156-MW8A-20171121/156-MW8A-20171121X
Aqueous - Is RPD is <20%?		X		No action; see table
Soil - Is RPD is <35%?			X	
<b>Percent Solids data included in Lab Package?</b>			X	
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	
Total Chromium concentration >hexavalent chromium in associated samples?	X			

**Blanks**

Analyte	Result	3X	10X	Sample Actions
Equipment Blank	(ug/L)	(ug/L)	(ug/L)	
Nickel	1.3	3.9	13	JC55900-1A, JC55900-2A >3X but <10X EB; Estimate J JC55900-3A Nondetect; Accept

**Field Duplicate**

Analyte	Sample	Result	RL	Duplicate	Dup Result	Dup RL	Units	Actions
CHROMIUM	156-MW8A-20171121	0.9B	10	156-MW8A-20171121X	1.4B	10	ug/l	Both results less than 5X RL, absolute difference less than the RL; Accept
VANADIUM	156-MW8A-20171121	1.7B	50	156-MW8A-20171121X	2.5B	50	ug/l	

## Data Validation Report

Project:	PPG Site 156 - Metro Towers 2017 Supplemental RI		
Laboratory:	SGS/Accutest, Dayton, NJ		
Laboratory Job No.:	JC57819		
Analysis/Method:	Hexavalent Chromium SW846 3060A/7196A Antimony, Chromium, Nickel, Thallium, and Vanadium SW-846 3050B/6010C		
Validation Level:	Full (Hexavalent Chromium) Limited (Metals)		
Site Location/Address:	PPG Site 156 - Metro Towers, Jersey City, New Jersey		
AECOM Project No:	60493065		
Prepared by:	Charlene Livingston Flint /AECOM	Completed on:	01/05/2018
Reviewed by:	Mary Kozik/AECOM	File Name:	JC57819_2018-01-05_DVReport-F

### Introduction

The data were reviewed in accordance with the FSP-QAPP and the following NJDEP validation Standard Operating Procedures (SOP):

- NJDEP Office of Data Quality SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium - for USEPA SW-846 Method 3060A, USEPA SW-846 Method 7196A and USEPA SW-846 Method 7199;
- NJDEP Office of Data Quality SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods)

The results of quality control data analyzed with site samples were used to assess the overall reliability of the data. The following qualifiers were used to identify data quality issues:

- U: Indicates the analyte was not detected in the sample above the sample reporting limit.
- J: Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
- J+: Indicates the analyte was positively identified; the associated numerical value is an estimated quantity with a potential high bias.
- J-: Indicates the analyte was positively identified; the associated numerical value is an estimated quantity with a potential low bias.
- UJ: Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.

- UB: The analyte concentration is less than or equal to three (3) times the concentration in the associated method/prep blank. The presence of the analyte in the sample is negated (UB) due to laboratory contamination.
- JB: The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/prep blank. The presence of that analyte in the sample is considered "real". The concentration is quantitatively qualified (JB) due to method blank contamination.
- R: The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA: The sample result was rejected but is still considered usable.

### Sample Information

The samples listed below were collected by AECOM on December 21, 2017 as part of the PPG Site 156 - Metro Towers 2017 Supplemental RI at Jersey City, New Jersey. Only the samples and parameters listed below were validated.

Field ID	Laboratory ID	Matrix	Fraction
156-FB-20171221 (Equipment Blank)	JC57819-4, -4A	Aqueous	Hexavalent Chromium and Metals*
156-MW8A-20171221	JC57819-1, -1A	Ground Water	Hexavalent Chromium and Metals*
156-MW8A-20171221X (Field Duplicate of 156-MW8A-20171221)	JC57819-2, -2A	Ground Water	Hexavalent Chromium and Metals*
156-MW8B-20171221	JC57819-3, -3A	Ground Water	Hexavalent Chromium and Metals*
*Metals (Sb, Cr, Ni, Tl, V)			

The samples were collected following the procedures detailed in the Work Order for PPG Site 156 - Metro Towers 2017 Supplemental RI at Jersey City, New Jersey and the Field Sampling Plan/Quality Assurance Project Plan for Non-Residential and Residential Chromium Sites Hudson County, New Jersey (December 2011).

### General Comments

The data package was complete. Quality control (QC) issues identified during validation are discussed below. Refer to the Target Analyte Summary Hit List(s) in Attachment A for a listing of all detected results, qualified results, and associated qualifications, where applicable. The nonconformances for each section discussed below are presented in Attachment B.

### Hexavalent Chromium

There were no QC nonconformances noted during validation, thus the data were accepted as reported by the laboratory.

## **MS Results**

Sample 156-MW8A-20171221 (JC57819-1) was selected for the matrix spike (MS) analysis associated with the samples in this SDG and was used for supporting data quality recommendations. The aqueous MS recovery was 100%; which met the quality control criteria of 85-115%. No data qualification was required on the basis of spike recoveries.

## **TAL Metals**

### **Laboratory Blanks/Equipment Blanks**

Nickel was reported in the Equipment Blank (EB) 156-FB-20171221, at a concentration greater than the method detection limit (MDL) but less than the reporting limit (RL). The associated samples 156-MW8A-20171221 (JC57819-1A) and 156-MW8A-20171221X (JC57819-2A) reported nickel at concentrations less than three times the EB; therefore, nickel was negated (UJ) in these samples. Nickel was not detected in sample 156-MW8B-20171221 (JC57819-3A); therefore, no qualification was necessary for this sample.

## **Sample Results**

Reported results (flagged B by the laboratory) that were less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL) are approximate values that have been qualified as estimated (J).

The reporting limits for two nondetect thallium results were above the NJDEP Specific Ground Water Quality Criteria due to elevated levels of an interfering element. These nondetect results are usable for project objectives as elevated reporting limits. Refer to the Target Analyte Summary Hitlist(s) in Attachment A and the nonconformance table(s) in Attachment B for a list of impacted sample results.

## **Data Quality and Usability**

In general, these data appear to be valid and may be used for decision-making purposes. No data were rejected. Qualified results, if applicable, are presented in Attachments A and B.

The nondetect results for thallium in two samples as presented in Attachment B, exceeded the Ground Water Reporting Limits Criteria; therefore, the nondetect results may not meet project objectives.

Sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

## **ATTACHMENTS**

Attachment A: Target Analyte Summary Hit List(s)

Attachment B: Data Validation Report Form



## **Attachment A**

### **Target Analyte Summary Hit List(s)**

**Aqueous Target Analyte Summary Hit List (Hexavalent Chromium)**

**Site Name** PPG Site 156 - Metro Towers 2017 Supplemental RI  
**Sampling Date** December 21, 2017  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC57819  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20171221

Field Sample ID	Lab Sample ID	Analyte	Method Blank (mg/l)	Laboratory Sample Result (mg/l)	Validation Sample Result (mg/l)	RL (mg/l)	Quality Assurance Decision	NJDEP Validation Footnote
No positive results and no qualified non-detects								

**Aqueous Target Analyte Summary Hit List (TAL Metals)**

**Site Name** PPG Site 156 - Metro Towers 2017 Supplemental RI  
**Sampling Date** December 21, 2017  
**Lab Name/ID** SGS/Accutest, Dayton, NJ  
**SDG No** JC57819  
**Sample Matrix** Aqueous  
**Trip Blank ID** NA  
**Field Blank ID** 156-FB-20171221

Field Sample ID	Lab Sample ID	Analyte	Method Blank (ug/l)	Laboratory Sample Result (ug/l)	Validation Sample Result (ug/l)	RL (ug/l)	Quality Assurance Decision	NJDEP Validation Footnote
156-MW8A-20171221	JC57819-1A	CHROMIUM	U	2.2B	2.2J	10	Qualify	1
156-MW8A-20171221X	JC57819-2A	CHROMIUM	U	2.4B	2.4J	10	Qualify	1
156-MW8B-20171221	JC57819-3A	CHROMIUM	U	4.5B	4.5J	10	Qualify	1
156-MW8A-20171221	JC57819-1A	NICKEL	U	9.2B	UJ	10	Negate	1,2
156-MW8A-20171221X	JC57819-2A	NICKEL	U	9.4B	UJ	10	Negate	1,2
156-FB-20171221	JC57819-4A	NICKEL	U	4.9B	4.9J	10	Qualify	1
156-MW8B-20171221	JC57819-3A	THALLIUM	U	9.7B	9.7J	10	Qualify	1
156-MW8A-20171221	JC57819-1A	VANADIUM	U	2.6B	2.6J	50	Qualify	1
156-MW8A-20171221X	JC57819-2A	VANADIUM	U	2.3B	2.3J	50	Qualify	1
156-MW8B-20171221	JC57819-3A	VANADIUM	U	41.8B	41.8J	50	Qualify	1

**Note:** A "U" under Method Blank column indicates a nondetect result.

**NJDEP Laboratory Footnote**

1. The reported result was greater than the MDL but less than the RL and qualified (J) as estimated by the laboratory.
2. The value reported is less than or equal to 3x the value in the trip/field blank. It is the policy of NJDEP-DPFSR to negate the reported value as due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte was detected.

**Attachment B**

**Data Validation Report Form**

<b>Client Name:</b> PPG Industries	<b>Project Number:</b> 60493065
<b>Site Location:</b> PPG Site 156 - Metro Towers 2017 Supplemental RI, Jersey City, NJ	<b>Project Manager:</b> William Spronz
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ	<b>Type of Validation:</b> Full
<b>Laboratory Job No:</b> JC57819	<b>Date Checked:</b> 01/05/2017
<b>Validator:</b> Charlene Livingston Flint	<b>Peer:</b> Mary Kozik

ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?	X			
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6 °C?	X			3 °C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?			X	Aqueous samples
Holding time to digestion met criteria? (Soils -30 days from collection to digestion.)			X	Aqueous samples
Date of analysis included?	X			
Holding time to analysis met criteria? (Soils -168 hours from digestion to analysis; Aqueous - 24 hours from collection to analysis.)	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			

Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation ;Corr - Correlation Coefficient.

ITEM	YES	NO	N/A	COMMENTS
<b>Initial calibration documentation included in lab package?</b>	X			
1) Blank plus 4 standards (7196A) or blank plus 3 standards (7199)	X			
2) Correlation coefficient of =0.995 (7196A) or =0.999 (7199)	X			
3) Calibrate daily or each time instrument is set up.	X			
<b>Calibration Check Standard (CCS) for 7196A and Quality Control Sample (QCS) for 7199 Included in Lab Package?</b>	X			
1) %R criteria met? (90 - 110%)	X			
2) Correct frequency of one per every 10 samples	X			
3) CCS and QCS from independent source and at mid-level of calibration curve	X			
<b>Calibration Blanks</b>	X			
1) Analyzed prior to initial calibration standards and after each CCS/QCS?	X			
2) Absolute value should not exceed MDL.		X		CCB>MDL, SR ND No qualifications made.
<b>Method Blank, Field Blanks and/or Equipment Blanks Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch?	X			
2) Absolute value should not exceed MDL.	X			
<b>Eh and pH Data</b>	X			
1) Eh and pH data was included and plotted for all samples?	X			
<b>Soluble Matrix Spike Data Included in Lab Package?</b>	X			JC57819-1
1) Soluble Matrix %R criteria met? (75-125%R).	X			
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	Aq sample. Spiked at 0.150 mg/l
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?	X			
<b>Insoluble Matrix Spike Data Included in Lab Package?</b>			X	
1) Insoluble Matrix %R criteria met? (75-125%R).			X	
2) Was the spike concentration around 400 to 800 mg/Kg?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	

ITEM	YES	NO	N/A	COMMENTS
<b>Post Digestion Spike</b>			X	
1) Post Digestion Spike %R criteria met? (85-115%R).			X	
2) Was the spike concentration 40 mg/Kg or twice the sample concentration?			X	
3) Was a sample spiked at the frequency of 1 per batch or 20 samples?			X	
<b>Sample Duplicate Data Included in Lab Package?</b>	X			JC57819-1
1) RPD criteria met? (RPD $\leq$ 20%) if both results are $\geq$ 4x RL or absolute difference $\pm$ RL if either or both results are $<$ 4xRL	X			Both ND
2) Was a sample duplicate analyzed at the frequency of 1 per batch or 20 samples?	X			
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Were any Field Duplicate samples submitted with this SDG?</b>	X			156-MW8A-20171221 (JC57819-1) & 156-MW8A-20171221X (JC57819-2)
1) Were Field duplicate RPD criteria met? (RPD $\leq$ 20% if both sample results $\geq$ 4xR, or absolute difference $\pm$ RL if either or both results are $<$ 4xRL.	X			Both ND
<b>Were all sample quantitation and reporting requirements met?</b>	X			
1) Were all solid samples reported with percent solids $>$ 50%?			X	Aq samples
2) Were any samples analyzed or reported with dilutions?		X		
<b>Miscellaneous Items</b>	X			
1) For soils by 7196A, was the pH within a range of 7.0-8.0?			X	
2) For soils by 7199, was the pH within a range of 9.0-9.5?			X	
3) For aqueous by 7196A, was the pH with a range of 1.5-2.5?	X			
4) For soils (3060A), was the digestion temperature 90-95C for at least 60 minutes?			X	
5) For 7199, was each sample injected twice and was the			X	

RPD $\leq$ 20?				
<b>Total Cr vs Cr6 Fraction Agreement Reviewed</b>	X			Total CR greater than total hexavalent chromium



**SDG#: JC57819/ Method 7196**

**Batch: GN74213**

Cr+6 ICAL 12/21/17

Soil

(p. 225 of data pkg)

x - concentration	y - response
0	0
0.01	0.009
0.05	0.045
0.1	0.08
0.3	0.271
0.5	0.481
0.8	0.749
1	0.939

(p. 225 of data pkg)

AECOM Calculated Offset	-0.0040	OK	Reported Offset	-0.0040
AECOM Slope	0.9442	OK	Reported Slope	0.9442
AECOM Calculated r	0.99979	OK	Reported r	0.99979

**LCS calculation**

**GP74213-B1 P. 221,225**

Background Absorbance	0
Total absorbance	0.137
Total absorbance - background	0.137
Instrument Concentration	0.149
Sample weight (mg/l)	0.05
Final Volume (L)	0.05
Dilution Factor	1

AECOM Calculated LCS Result (mg/l)	0.149	OK	Reported Result (mg/Kg)	0.15
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**%R = Found/True\*100**

**GP74213-B1 P. 221,225**

True Value (mg/l)	0.15
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AECOM Calculated %R	100	OK	Reported %R	100
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**MS calculation**

**GP74213-S1 P. 223,225 JC57819-1**

Background reading	0.003
Total absorbance	0.141
Total absorbance - background	0.138
Instrument Concentration	0.1504
Sample weight (mg/l)	0.05
Final Volume (L)	0.05
Dilution Factor	1

AECOM Calculated MS Result (mg/l)	0.15	OK	Reported Result (mg/l)	0.15
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**%R = Found/True\*100**

**GP74213-S1 P. 223,225 JC57819-1**

True Value (mg/l)	0.15
Native concentration (mg/l)	0

AECOM %R	100	OK	Reported %R	100
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**Reporting Limit**

**JC57819-1 P. 8,225 156-MW8A-20171221**

Low Standard	0.01
Initial weight (mg/l)	0.05
Final volume (L)	0.05
Dilution Factor	1

Reporting Limit	0.010	OK	Reported RL (mg/l)=	0.010
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<u>Sample Calculations</u>	JC57819-1	P. 8,225	156-MW8A-20171221
Background reading	0.003		
Total absorbance	0.004		
Total absorbance - background	0.001		
Instrument Response	0.005		
Sample weight (mg/l)	0.05		
Final Volume (L)	0.05		
Dilution Factor	1		
AECOM Calculated Result (mg/l)	0.005	<MDL, ND	Reported Result (mg/l) 0.0081 U

<b>Client Name:</b> PPG Industries		<b>Project Number:</b> 60493065		
<b>Site Location:</b> PPG Site 156 - Metro Towers 2017 Supplemental RI		<b>Project Manager:</b> William Spronz		
<b>Laboratory:</b> SGS/Accutest, Dayton, NJ		<b>Type of Validation:</b> Full		
<b>Laboratory Job No:</b> JC57819		<b>Date Checked:</b> 01/05/2017		
<b>Validator:</b> Charlene Livingston Flint		<b>Peer:</b> Mary Kozik		
ITEM	YES	NO	N/A	COMMENTS
Sample results included?	X			
Reporting Limits met project requirements?		X		See table below
Field I.D. included?	X			
Laboratory I.D. included?	X			
Did data package sample IDs match sample IDs on COC?	X			
Did electronic data deliverable (EDD) sample IDs match COC sample IDs?	X			
Did data package sample IDs match electronic data deliverable (EDD) sample IDs?	X			
Sample matrix included?	X			
Sample receipt temperature 2-6 °C?	X			3 °C
Signed COCs included?	X			
Date of sample collection included?	X			
Date of sample digestion included?			X	Aqueous samples
Date of analysis included?	X			
Holding time met QC criteria? (Metals -180 days from sample collection; Mercury - 28 days from sample collection. If HT exceeded by 10 days R all results.	X			
Method reference included?	X			
Laboratory Case Narrative included?	X			
Definitions: MDL - Method Detection Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RSD - Relative Standard Deviation :Corr - Correlation Coefficient.				

ITEM	YES	NO	N/A	COMMENTS
Sample dilutions?	X			Sample 156-MW8B-20171221 (JC57819-3) was diluted 5X.
<b>Initial calibration documentation included in lab package?</b>			X	N/A for Limited Validation
1) Calibrate daily or each time instrument is set up.			X	
2) ICP (6010) - plus 1 standard?			X	
3) Cn and Hg -Blank plus 5 standards?			X	
<b>Initial Calibration Verification Standard (ICV) for ICP (6010) and Initial Calibration Check Standard (ICCS) for Hg (7470/7471) included in lab package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after initial calibration?			X	
2) %R criteria met? (90-110%).			X	
3) Spot check ICV/ICCS results for several analytes.			X	
<b>Continuing Calibration Verification Standard (CCV) for ICP (6010) and Calibration Check Standard (CCS) for Hg (7470/7471) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed immediately after each ICV/ICC/CB and after every 10 samples?			X	
2) CCS and CCV from independent source and at mid-level of calibration curve?			X	
3) %R criteria met? (90-110%R).			X	
4) Spot check CCV/CCS results for several analytes.			X	
<b>Low Calibration Standard (CRI) included in Lab Package?</b>			X	
1) %R criteria met? - 50-150% for Co, Mn, Zn, by ICP-MS; Pb, Tl by 6010; 70-130% all others			X	
<b>Calibration Blanks</b>			X	N/A for Limited Validation
1) Analyzed after daily calibration and after each ICV/ICC/CCV/CCS and after every 10 samples?			X	
2) Absolute value <3xIDL?			X	
<b>Method Blank Included in Lab Package?</b>	X			
1) Method blank analyzed with each preparation batch or every SDG, or 1/20 samples? No aqueous MB required for FB/EB if only soil samples were analyzed.	X			
2) Method blank analyzed 1/20 samples?	X			
3) MB results nondetect?	X			
4) Negative MB result reported?		X		

ITEM	YES	NO	N/A	COMMENTS
<b>Field Blanks/Equipment Blanks Included in Lab Package?</b>	X			
1) FB/EB result non-detect?		X		See table
<b>ICP Interference Check Sample (ICS) included in Lab Package?</b>			X	N/A for Limited Validation
1) Analyzed at beginning of analytical run?			X	
2) %R criteria met? (80-120%)			X	
3) Spot check accuracy of %Rs			X	
<b>Matrix Spike/Matrix Spike Duplicate Data Included in Lab Package?</b>	X			JC57819-1A
1) MS/MSD %R (75-125%R) and RPD (20%) criteria met?	X			
2) Was a sample spiked at the frequency of 1/batch or 20 samples?	X			
3) Was the MS performed on a site sample?	X			
4) Was the MS performed on a FB/EB or TB?		X		
<b>Post Digestion Spike</b>			X	
1) %R criteria met? (75-125%R)			X	
2) Was the spike performed on a FB/EB or TB?			X	
3) Was a sample spiked at the frequency of 1/batch or 20 samples?			X	
<b>Laboratory Duplicate Data Included in Lab Package?</b>		X		
Aqueous – Is RPD ≤ 20%?			X	
Soil – Is RPD ≤ 35%?			X	
<b>Was a Laboratory Control Sample (LCS) Included in Lab Package?</b>	X			
1) LCS %R criteria met? (80-120%R).	X			
2) Was an LCS analyzed at the frequency of 1/batch or 20 samples?	X			
<b>Serial Dilution</b>			X	N/A for Limited Validation
1) %D (<10%R) criteria met? -			X	
2) Was the frequency 1/batch or 20 samples?			X	
3) Was a site sample used?	X			
4) Was a FB/EB or TB used?			X	

5) Spot check accuracy of %Ds.			X	
<b>Field Duplicate Data included in Lab Package?</b>	X			JC57819-1A & -2A
Aqueous - Is RPD is <20%?	X			All results met QC limits or were Both ND.
Soil - Is RPD is <35%?			X	
<b>Percent Solids data included in Lab Package?</b>			X	Aqueous samples
1) %Solids criteria (Reg 2 criteria) met? (>=50%)			X	
<b>Total Cr vs Cr6 Fraction Agreement Reviewed</b>	X			Total Cr greater than total hexavalent chromium.

**Field Blanks**

Analyte	Result	3X	10X	Action	Associated Samples
Nickel	4.9	14.7	49	ND, OK	156-MW8B-20171221
Nickel	4.9	14.7	49	<3X FB, Negate (UJ)	156-MW8A-20171221, 156-MW8A-20171221X

**Reporting Limits GW Metals**

Sample ID	Lab ID	Analyte	Result	Detect Flag	Units	GWQS Action Level
156-MW8A-20171221	JC57819-1A	THALLIUM	8.2	N	ug/l	2
156-MW8A-20171221X	JC57819-2A	THALLIUM	8.2	N	ug/l	2