

ATTACHMENT F

DATA VALIDATION REPORTS

07 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04531

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04531

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04531-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-050911-1	001	A	05/09/11	X	05/09/11	n/a	05/09/11
121_	B2_1.5	002	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B2_4.5	004	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B2_8.0	007	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B2_12.0	009	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B1_1.0	011	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B1_4.5	013	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B1_8.0	015	S	05/09/11	X	05/09/11	05/12/11	05/12/11
121_	B1_12.0	017	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B6_1.0	019	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B6_4.0	021	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B6_8.0	023	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B6_12.0	025	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	REP050911-1	026	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B8_1.0	028	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B8_6.0	031	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B8_9.0	032	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B8_12.0	034	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B9_1.0	036	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	REP050911-2	037	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B9_4.0	039	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B9_8.0	041	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B9_12.0	043	S	05/09/11	X	05/09/11	05/12/11	05/12/11
207_	B9_14.5	044	S	05/09/11	X	05/09/11	05/12/11	05/12/11

S = Non-Aqueous Matrix

Total Samples = 24

A = Aqueous Matrix

All samples were received on the same day as collected. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

Cr⁺⁶ was not detected in Field Blank FB-050911-1.

Matrix spike recoveries for soluble and insoluble Cr⁺⁶ in batch QC samples E11-04531-39 (207_B9_4.0) and E11-04531-44 (207_B9_14.5) were below the allowable limit of 75% in both initial and re-analyses, as tabulated below. All associated batch samples were re-digested and re-analyzed with the batch spike samples, per NJDEP and method protocols.

Sample ID	Sol.Recov.	Insol.Recov.
04531-39	41%	86%
re-analysis	51%	82%
04531-44	12%	70%
re-analysis	5%	64%

- QA Action:
 - 1) Qualify Cr⁺⁶ results in batch samples associated with E11-04531-39 (samples 02 – 39) as estimated, ‘UJ’, per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e).
 - 2) Qualify Cr⁺⁶ results in batch samples associated with E11-04531-44 (samples 41 – 44) as rejected, ‘R’, per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e).
- Data Usability: Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. All SDG Cr⁺⁶ samples were characterized as “Reducing” based upon the Method 3060A, Table 2 phase diagram; these samples are not likely to support the presence of Cr⁺⁶.

Samples (REP050911-1 and 207_B6_12.0) and (REP050911-2 and 207_B9_1.0) were identified as collocated field duplicate pairs for this sample group. Results for Cr⁺⁶ in all samples within both field duplicate pairs were reported as non-detect.

SECTION D pH / Eh (ORP)

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

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

Dresdner-Robin

Mr. John Tregidgo

07 July, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/06/11

SDG No.: E11-04531

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/6/2011

Check one: Lab ID 04531-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04531-001		A	05/09/11	05/09/11	0	ACCEPT
04531-002		S	05/09/11	05/12/11	0	ACCEPT
04531-004		S	05/09/11	05/12/11	0	ACCEPT
04531-007		S	05/09/11	05/12/11	0	ACCEPT
04531-009		S	05/09/11	05/12/11	0	ACCEPT
04531-011		S	05/09/11	05/12/11	0	ACCEPT
04531-013		S	05/09/11	05/12/11	0	ACCEPT
04531-015		S	05/09/11	05/12/11	0	ACCEPT
04531-017		S	05/09/11	05/12/11	0	ACCEPT
04531-019		S	05/09/11	05/12/11	0	ACCEPT
04531-021		S	05/09/11	05/12/11	0	ACCEPT
04531-023		S	05/09/11	05/12/11	0	ACCEPT
04531-025		S	05/09/11	05/12/11	0	ACCEPT
04531-026		S	05/09/11	05/12/11	0	ACCEPT
04531-028		S	05/09/11	05/12/11	0	ACCEPT
04531-031		S	05/09/11	05/12/11	0	ACCEPT
04531-032		S	05/09/11	05/12/11	0	ACCEPT
04531-034		S	05/09/11	05/12/11	0	ACCEPT
04531-036		S	05/09/11	05/12/11	0	ACCEPT
04531-037		S	05/09/11	05/12/11	0	ACCEPT
04531-039		S	05/09/11	05/12/11	0	ACCEPT
04531-041		S	05/09/11	05/12/11	0	ACCEPT
04531-043		S	05/09/11	05/12/11	0	ACCEPT
04531-044		S	05/09/11	05/12/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.497 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 99.3
(Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/09/11 (H₂O), 05/12/11 and 05/14/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : 04531-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : Soil samples for SDG 04531 were extracted in two discrete prep batches (AP011- 0044 and -0045). Method (prep) blanks for all batches were non-detect (ND) for Cr⁺⁶.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|------------------------------------|
| 1. Was the pre-digestion spike analysis performed at the correct frequency ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, note deviations and action : _____ | | |
| _____ | | |
| 2. Was the pre-digestion spike analysis performed on a field sample ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, qualify all associated samples. | | |
| 3. Was the pre-digestion spike analysis performed at the proper concentration ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, list action : _____ | | |
| _____ | | |
| 4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ? | <input type="checkbox"/> | <input type="checkbox" value="X"/> |

If No, list action :

Sample ID	Sol.Recov.	Insol.Recov.	Ox / Red ?
04531-39	41%	86%	R
re-analysis	51%	82%	
04531-44	12%	70%	R
re-analysis	5%	64%	

05431-39 : sample shows reducing tendency based on ORP. Qualify associated batch samples (02-39). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

04531-44 : sample shows reducing tendencies based on ORP. Reject 'R' associated batch samples (41-44). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike Sample ID: 04531-39 RE
 Lab spiked sample value : 23.7
 Lab un-spiked sample value : 0.0
 Spike added concentration : 46.7

Calculated value = 50.7 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 51 % recovery

Verified ? yes

b. Insoluble Spike Sample ID: 04531-44
 Lab spiked sample value : 1230
 Lab un-spiked sample value : 0.0
 Spike added concentration : 1760

Calculated value = 69.9 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 70 % recovery

Verified ? yes

6. Specific comments : NJDEP SOP No. 5.A.10, Rev.3 specifies data qualification actions based upon batch spike recoveries. Data usability is addressed in the data validation narrative.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04531-39
04531-44

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >) YES NO

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04531-039
Lab spiked sample value : 42.3
Lab un-spiked sample value : 0.0
Spike added concentration : 46.7

Calculated value = 90.6 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 91 % recovery

Verified ? yes

Sample ID: 04531-44
Lab spiked sample value : 62.6
Lab un-spiked sample value : 0.0
Spike added concentration : 72.9

Calculated value = 85.9 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 86 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04531-039 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04531-39
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

 $\% \text{ RPD} = \frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

Sample ID: 04531-44
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

 $\% \text{ RPD} = \frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : ND = Not Detected

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES NO

1. Was the LCS performed at the correct frequency ?

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ?

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.1 Lab value : 93 % Recovery
LCS true value : 40.0 Calculated value = 92.8 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : Soil samples were extracted in two separate batches; a soil LCS was
prepared and analyzed for each extraction batch. All LCS recoveries
were within acceptable limits of 80 - 120%.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04531-39

Sample dry weight <u>4.10</u>	Lab value : <u>85.6</u> % Solids
Sample wet weight <u>4.79</u>	
Calculated % Solids = <u>85.6</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.4085</u> mg/L	Sample ID: <u>04531-39 Soluble Spike</u>
% Solids = <u>85.6</u> %	Lab value : <u>19.1</u> mg/Kg
	Calculated value = <u>19.1</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	<u>0.40854073</u>	<u>0.100</u>	<u>1.0</u>	=	19.091
	<u>0.0025</u>	<u>0.856</u>			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

11 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04574

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04574

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04574-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051011-1	001	A	05/10/11	X	05/10/11	n/a	05/10/11
121_	B12_1.0	002	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B12_5.5	004	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B12_9.5	006	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B12_13.0	008	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B12_17.0	010	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B11_1.0	011	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B11_5.5	013	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B11_9.5	015	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B11_13.5	017	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B11_17.0	019	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	REP051011-1	020	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B9_1.5	021	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B9_5.5	023	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B9_9.5	025	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B9_13.5	027	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B9_17.0	029	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B10_1.0	030	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	REP051011-2	031	S	05/10/11	X	05/11/11	05/13/11	05/13/11
121_	B10_5.5	033	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B10_9.5	035	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B10_13.5	037	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B10_17.0	039	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B13_1.0	040	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B13_5.5	042	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B13_8.5	044	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B13_12.5	046	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B13_16.0	048	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B5_1.0	049	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B5_7.5	052	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B5_9.5	053	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	REP051011-3	054	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B5_13.5	056	S	05/10/11	X	05/11/11	05/16/11	05/16/11
121_	B5_17.0	058	S	05/10/11	X	05/11/11	05/16/11	05/16/11

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 34

Soil samples were received one day after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

Cr^{+6} was not detected in Field Blank FB-051011-1.

Samples (REP051011-1 and 121_B11_17.0), (REP051011-2 and 121_B10_1.0) and (REP051011-3 and 121_B5_9.5) were identified as collocated field duplicate pairs for this sample group. Results for Cr^{+6} in all samples within all field duplicate pairs were reported as non-detect.

SECTION D pH / Eh (ORP)

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

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

SECTION E Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/11/11

SDG No.: E11-04574

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Morris Canal

Laboratory Name : IAL

Chris Taylor

Date of Review: 7/11/2011

(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
1	A	05/10/11	05/10/11	0	ACCEPT
2	S	05/10/11	05/13/11	0	ACCEPT
4	S	05/10/11	05/13/11	0	ACCEPT
6	S	05/10/11	05/13/11	0	ACCEPT
8	S	05/10/11	05/13/11	0	ACCEPT
10	S	05/10/11	05/13/11	0	ACCEPT
11	S	05/10/11	05/13/11	0	ACCEPT
13	S	05/10/11	05/13/11	0	ACCEPT
15	S	05/10/11	05/13/11	0	ACCEPT
17	S	05/10/11	05/13/11	0	ACCEPT
19	S	05/10/11	05/13/11	0	ACCEPT
20	S	05/10/11	05/13/11	0	ACCEPT
21	S	05/10/11	05/13/11	0	ACCEPT
23	S	05/10/11	05/13/11	0	ACCEPT
25	S	05/10/11	05/13/11	0	ACCEPT
27	S	05/10/11	05/13/11	0	ACCEPT
29	S	05/10/11	05/13/11	0	ACCEPT
30	S	05/10/11	05/13/11	0	ACCEPT
31	S	05/10/11	05/13/11	0	ACCEPT
33	S	05/10/11	05/16/11	0	ACCEPT
35	S	05/10/11	05/16/11	0	ACCEPT
37	S	05/10/11	05/16/11	0	ACCEPT
39	S	05/10/11	05/16/11	0	ACCEPT
40	S	05/10/11	05/16/11	0	ACCEPT
42	S	05/10/11	05/16/11	0	ACCEPT
44	S	05/10/11	05/16/11	0	ACCEPT
46	S	05/10/11	05/16/11	0	ACCEPT
48	S	05/10/11	05/16/11	0	ACCEPT
49	S	05/10/11	05/16/11	0	ACCEPT
52	S	05/10/11	05/16/11	0	ACCEPT
53	S	05/10/11	05/16/11	0	ACCEPT
54	S	05/10/11	05/16/11	0	ACCEPT
56	S	05/10/11	05/16/11	0	ACCEPT
58	S	05/10/11	05/16/11	0	ACCEPT

samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
 (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
 If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
 (Beginning of run, after each 10 samples, end of run.)
 If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
 If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
 If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.497 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 99.3
 (Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/10/11 (H₂O), 05/13/11 and 05/16/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : 04574-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : Soil samples for SDG 04574 were extracted in two discrete prep batches (AP011- 0047 and
-0049). Method (prep) blanks for all batches were non-detect (ND) for Cr⁺⁶.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the pre-digestion spike analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the pre-digestion spike analysis performed on a field sample ?

If No, qualify all associated samples.

3. Was the pre-digestion spike analysis performed at the proper concentration ?

If No, list action : _____

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike Sample ID: 04574-31
 Lab spiked sample value : 36.2
 Lab un-spiked sample value : 0.0
 Spike added concentration : 43.7

Calculated value = 82.8 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 83 % recovery

Verified ? yes

b. Insoluble Spike Sample ID: 04574-58
 Lab spiked sample value : 942
 Lab un-spiked sample value : 0.0
 Spike added concentration : 1100

Calculated value = 85.6 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 86 % recovery

Verified ? yes

6. Specific comments : NJDEP SOP No. 5.A.10, Rev.3 specifies data qualification actions based upon batch spike recoveries. Data usability is addressed in the data validation narrative.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04574-31
04574-58

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04574-31
Lab spiked sample value : 38.3
Lab un-spiked sample value : 0.0
Spike added concentration : 43.7

Calculated value = 87.6 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 88 % recovery

Verified ? yes

Sample ID: 04574-58
Lab spiked sample value : 38.8
Lab un-spiked sample value : 0.0
Spike added concentration : 44.8

Calculated value = 86.6 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 87 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04574-31 _____
04574-58 _____

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES

NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04574-31
Lab sample value : ND
Lab duplicate value : ND

Sample ID: 04574-58
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

Calculated value = no calc % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : ND = Not Detected

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES

NO

1. Was the LCS performed at the correct frequency ?

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ?

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.6
LCS true value : 40.0

Lab value : 94 % Recovery

Calculated value = 94.0 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : Soil samples were extracted in two separate batches; a soil LCS was
prepared and analyzed for each extraction batch. All LCS recoveries
were within acceptable limits of 80 - 120%.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04574-31

Sample dry weight <u>4.37</u>	Lab value : <u>91.6</u> % Solids
Sample wet weight <u>4.77</u>	
Calculated % Solids = <u>91.6</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.8287</u> mg/L	Sample ID: <u>04574-31 Soluble Spike</u>
% Solids = <u>91.6</u> %	Lab value : <u>36.2</u> mg/Kg
	Calculated value = <u>36.2</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	<u>0.82866347</u>	<u>0.100</u>	<u>1.0</u>	=	36.186
	<u>0.0025</u>	<u>0.916</u>			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

11 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04630

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04630

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04630-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051111-1	001	A	05/11/11	X	05/11/11	n/a	05/11/11
121_	B7_1.0	002	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B7_5.5	004	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B7_9.5	006	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B7_13.0	008	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	<i>B6_1.0</i>	010	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	<i>REP051111-1</i>	011	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B6_5.5	013	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B6_9.5	015	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B6_13.5	017	S	05/11/11	X	05/12/11	05/17/11	05/17/11
121_	B6_17.5	019	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	B1_1.0	020	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	<i>B1_5.5</i>	022	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	<i>REP051111-2</i>	023	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	B1_9.5	025	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	B1_13.0	027	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P6_	B1_17.5	029	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P3_	B1_3.5	032	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P3_	B1_5.5	033	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P3_	B1_9.5	035	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P3_	B1_13.5	037	S	05/11/11	X	05/12/11	05/17/11	05/17/11
P3_	B1_17.5	039	S	05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	<i>B5_1.0</i>	041	S	05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	<i>REP051111-3</i>	042	S	05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	B5_5.5	044		05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	B5_9.5	046		05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	B5_13.5	048		05/11/11	X	05/12/11	05/17/11	05/18/11
P8_	B5_17.5	050		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	<i>B17_1.0</i>	052		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	<i>REP051111-4</i>	053		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B17_5.5	055		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B17_9.5	057		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B17_13.5	059		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B17_17.5	061		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B16_1.5	063		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B16_5.5	065		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B16_9.5	067		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B16_13.5	069		05/11/11	X	05/12/11	05/17/11	05/18/11
207_	B16_17.5	071		05/11/11	X	05/12/11	05/17/11	05/18/11

S = Non-Aqueous Matrix

Total Samples = 39

A = Aqueous Matrix

Soil samples were received one day after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C
Hexavalent Chromium

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

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

Cr^{+6} was not detected in Field Blank FB-051111-1.

Matrix spike recoveries for soluble Cr^{+6} in batch QC samples E11-04630-37 (P3_B1_13.5) and E11-04630-71 (207_B16_17.5) were below the allowable limit of 75% in both initial and re-analyses, as tabulated below. All associated batch samples were re-digested and re-analyzed with the batch spike samples, per NJDEP and method protocols.

Sample ID	Sol.Recov.	Insol.Recov.
04630-37	53%	92%
re-analysis	34%	87%
04630-71	10%	86%
re-analysis	22%	82%

- **QA Action:** Qualify Cr^{+6} results in batch samples associated with E11-04630-37 and -71 (all soil samples) as rejected, 'R', per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e).
- **Data Usability:** Eh / pH results were evaluated to determine Redox characteristics of batch samples as an indicator of ability to support Cr^{+6} . All SDG Cr^{+6} samples were characterized as "Reducing" based upon the Method 3060A, Table 2 phase diagram, with the exception of the following samples: 04630-2, -10, -11, -13, -39 and -42, which were characterized as "Oxidizing". The samples designated as "reducing" are not likely to support the presence of Cr^{+6} .

Samples (REP051111-1 and 121_B6_1.0), (REP051111-2 and P6_B1_5.5), (REP051111-3 and P8_B5_1.0) and (REP051111-4 and 207_B17_1.0) were identified as collocated field duplicate pairs for this sample group. For the first noted set, results were 0.92 J and 0.83 J mg/Kg, which is within the acceptable $\pm 2x$ RL limit. Results for Cr^{+6} in all samples within the remaining field duplicate pairs were reported as non-detect.

SECTION D
pH / Eh (ORP)

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

Reported pH and eH (ORP) values and resulting ReDox (reducing or oxidizing) characteristics were randomly verified from the $HCrO_4^- / Cr(OH)_3$ phase diagram; no disparities relative to reported values and characteristics were found.

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/11/11

SDG No.: E11-04630

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/11/2011

Check one: Lab ID 04630-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04630-001		A	05/11/11	05/11/11	0	ACCEPT
04630-2		S	05/11/11	05/17/11	0	ACCEPT
04630-4		S	05/11/11	05/17/11	0	ACCEPT
04630-6		S	05/11/11	05/17/11	0	ACCEPT
04630-8		S	05/11/11	05/17/11	0	ACCEPT
04630-10		S	05/11/11	05/17/11	0	ACCEPT
04630-11		S	05/11/11	05/17/11	0	ACCEPT
04630-13		S	05/11/11	05/17/11	0	ACCEPT
04630-15		S	05/11/11	05/17/11	0	ACCEPT
04630-17		S	05/11/11	05/17/11	0	ACCEPT
04630-19		S	05/11/11	05/17/11	0	ACCEPT
04630-20		S	05/11/11	05/17/11	0	ACCEPT
04630-22		S	05/11/11	05/17/11	0	ACCEPT
04630-23		S	05/11/11	05/17/11	0	ACCEPT
04630-25		S	05/11/11	05/17/11	0	ACCEPT
04630-27		S	05/11/11	05/17/11	0	ACCEPT
04630-29		S	05/11/11	05/17/11	0	ACCEPT
04630-32		S	05/11/11	05/17/11	0	ACCEPT
04630-33		S	05/11/11	05/17/11	0	ACCEPT
04630-35		S	05/11/11	05/17/11	0	ACCEPT
04630-37		S	05/11/11	05/17/11	0	ACCEPT
04630-39		S	05/11/11	05/18/11	0	ACCEPT
04630-41		S	05/11/11	05/18/11	0	ACCEPT
04630-42		S	05/11/11	05/18/11	0	ACCEPT
04630-44		0	05/11/11	05/18/11	0	ACCEPT
04630-46		0	05/11/11	05/18/11	0	ACCEPT
04630-48		0	05/11/11	05/18/11	0	ACCEPT
04630-50		0	05/11/11	05/18/11	0	ACCEPT
04630-52		0	05/11/11	05/18/11	0	ACCEPT
04630-53		0	05/11/11	05/18/11	0	ACCEPT
04630-55		0	05/11/11	05/18/11	0	ACCEPT
04630-57		0	05/11/11	05/18/11	0	ACCEPT
04630-59		0	05/11/11	05/18/11	0	ACCEPT
04630-61		0	05/11/11	05/18/11	0	ACCEPT
04630-63		0	05/11/11	05/18/11	0	ACCEPT
04630-65		0	05/11/11	05/18/11	0	ACCEPT
04630-67		0	05/11/11	05/18/11	0	ACCEPT
04630-69		0	05/11/11	05/18/11	0	ACCEPT
04630-71		0	05/11/11	05/18/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
 (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
 If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
 (Beginning of run, after each 10 samples, end of run.)
 If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
 If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
 If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.497 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 99.48
 (Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/11/11 (H₂O), 05/17/11 and 05/18/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : 04630-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : Soil samples for SDG 04630 were extracted in two discrete prep batches (AP011- 0054 and
-0055). Method (prep) blanks for all batches were non-detect (ND) for Cr⁺⁶.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the pre-digestion spike analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the pre-digestion spike analysis performed on a field sample ?

If No, qualify all associated samples.

3. Was the pre-digestion spike analysis performed at the proper concentration ?

If No, list action : _____

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?

If No, list action :

Sample ID	Sol.Recov.	Insol.Recov.	Ox / Red ?
04630-37	53%	92%	R
re-analysis	34%	87%	
04630-71	10%	86%	R
re-analysis	22%	82%	

004630-37 : sample shows reducing tendency based on ORP. Reject 'R' associated batch samples (02-37). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

04630-71 : sample shows reducing tendencies based on ORP. Reject 'R' associated batch samples (39-71). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike Sample ID: 04630-37 RE
 Lab spiked sample value : 17.3
 Lab un-spiked sample value : 0.0
 Spike added concentration : 51.7

Calculated value = 33.5 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 34 % recovery

Verified ? yes

b. Insoluble Spike Sample ID: 04630-71
 Lab spiked sample value : 1010
 Lab un-spiked sample value : 0.0
 Spike added concentration : 1180

Calculated value = 85.6 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 86 % recovery

Verified ? yes

6. Specific comments : NJDEP SOP No. 5.A.10, Rev.3 specifies data qualification actions based upon batch spike recoveries. Data usability is addressed in the data validation narrative.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04630-37
04630-71

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >) X

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ? X

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ? X

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ? n/a

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ? n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04630-37
Lab spiked sample value : 48.0
Lab un-spiked sample value : 0.0
Spike added concentration : 51.7

Calculated value = 92.8 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 93 % recovery

Verified ? yes

Sample ID: 04630-71
Lab spiked sample value : 44.6
Lab un-spiked sample value : 0.0
Spike added concentration : 49.1

Calculated value = 90.8 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 91 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04630-37 _____
04630-71 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04630-37
Lab sample value : ND
Lab duplicate value : ND
Calculated value = no calc % RPD
% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

Sample ID: 04630-71
Lab sample value : ND
Lab duplicate value : ND
Calculated value = no calc % RPD
% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : ND = Not Detected

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES NO

1. Was the LCS performed at the correct frequency ?

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ?

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.6 Lab value : 94 % Recovery
LCS true value : 40.0 Calculated value = 94.0 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : Soil samples were extracted in two separate batches; a soil LCS was
prepared and analyzed for each extraction batch. All LCS recoveries
were within acceptable limits of 80 - 120%.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04630-37

Sample dry weight <u>3.84</u>	Lab value : <u>77.4</u> % Solids
Sample wet weight <u>4.96</u>	
Calculated % Solids = <u>77.4</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.5288</u> mg/L	Sample ID: <u>04630-37 Soluble Spike</u>
% Solids = <u>77.4</u> %	Lab value : <u>27.3</u> mg/Kg
	Calculated value = <u>27.3</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	0.52879412	0.100	1.0	=	27.328
	0.0025	0.774			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

11 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04676

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04676

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04676-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051211-1	001	A	05/12/11	X	05/12/11	n/a	05/13/11
207_	<i>B18_1.0</i>	2	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	<i>REP051211-1</i>	3	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B18_5.5	5	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B18_9.5	7	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B18_13.0	9	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B18_16.5	11	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B19_1.0	12	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B1_5.5	14	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B19_9.5	16	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B19_13.0	18	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B19_16.5	20	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	<i>B5_1.0</i>	21	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	<i>REP051211-2</i>	22	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B5_5.5	24	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B5_9.5	26	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B5_13.0	28	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B5_16.5	30	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B4_1.0	31	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B4_5.5	33	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B4_9.5	35	S	05/12/11	X	05/13/11	05/20/11	05/21/11
207_	B4_13.0	37	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B4_16.5	39	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B2_1.0	40	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B2_5.5	42	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B2_9.5	44	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B2_13.0	46	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B2_16.5	48	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B3_1.0	49	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B3_5.5	51	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B3_9.5	53	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	<i>B3_13.0</i>	55	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	<i>REP051211-3</i>	56	S	05/12/11	X	05/13/11	05/20/11	05/22/11
207_	B3_16.5	58	S	05/12/11	X	05/13/11	05/20/11	05/22/11

S = Non-Aqueous Matrix

A = Aqueous Matrix

Total Samples = 34

All samples were received one day after collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C
Hexavalent Chromium

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

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

Cr⁺⁶ was not detected in Field Blank FB-051211-1.

Matrix spike recoveries for soluble Cr⁺⁶ in batch QC samples E11-04676-35 (207_B4_9.5) and E11-04676-37 (207_B4_13.0) were below the allowable limit of 75% in both initial and re-analyses, as tabulated below. All associated batch samples were re-digested and re-analyzed with the batch spike samples, per NJDEP and method protocols.

Sample ID	Sol.Recov.	Insol.Recov.
04676-35	41%	83%
re-analysis	39%	84%
04676-37	22%	89%
re-analysis	35%	88%

- **QA Action:** Qualify Cr⁺⁶ results in batch samples associated with E11-04676-35 and -37 (all soil samples) as rejected, 'R', per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e).
- **Data Usability:** Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. All SDG Cr⁺⁶ samples were characterized as "Reducing" based upon the Method 3060A, Table 2 phase diagram, with the exception of the following samples: 04676-21, -22, -24 and -49, which were characterized as "Oxidizing". The samples designated as "reducing" are not likely to support the presence of Cr⁺⁶.

Samples (REP051211-1 and 207_B18_1.0), (REP051211-2 and 207_B5_1.0) and (REP051211-3 and 207_B3_13.0) were identified as collocated field duplicate pairs for this sample group. Results for Cr⁺⁶ in all samples within all field duplicate pairs were reported as non-detect.

SECTION D
pH / Eh (ORP)

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

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

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/11/11

SDG No.: E11-04676

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/11/2011

Check one: Lab ID 04676-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04676-001		A	05/12/11	05/13/11	0	ACCEPT
04676-002		S	05/12/11	05/21/11	0	ACCEPT
04676-003		S	05/12/11	05/21/11	0	ACCEPT
04676-005		S	05/12/11	05/21/11	0	ACCEPT
04676-007		S	05/12/11	05/21/11	0	ACCEPT
04676-009		S	05/12/11	05/21/11	0	ACCEPT
04676-011		S	05/12/11	05/21/11	0	ACCEPT
04676-012		S	05/12/11	05/21/11	0	ACCEPT
04676-014		S	05/12/11	05/21/11	0	ACCEPT
04676-016		S	05/12/11	05/21/11	0	ACCEPT
04676-018		S	05/12/11	05/21/11	0	ACCEPT
04676-020		S	05/12/11	05/21/11	0	ACCEPT
04676-021		S	05/12/11	05/21/11	0	ACCEPT
04676-022		S	05/12/11	05/21/11	0	ACCEPT
04676-024		S	05/12/11	05/21/11	0	ACCEPT
04676-026		S	05/12/11	05/21/11	0	ACCEPT
04676-028		S	05/12/11	05/21/11	0	ACCEPT
04676-030		S	05/12/11	05/21/11	0	ACCEPT
04676-031		S	05/12/11	05/21/11	0	ACCEPT
04676-033		S	05/12/11	05/21/11	0	ACCEPT
04676-035		S	05/12/11	05/21/11	0	ACCEPT
04676-037		S	05/12/11	05/22/11	0	ACCEPT
04676-039		S	05/12/11	05/22/11	0	ACCEPT
04676-040		S	05/12/11	05/22/11	0	ACCEPT
04676-042		0	05/12/11	05/22/11	0	ACCEPT
04676-044		0	05/12/11	05/22/11	0	ACCEPT
04676-046		0	05/12/11	05/22/11	0	ACCEPT
04676-048		0	05/12/11	05/22/11	0	ACCEPT
04676-049		0	05/12/11	05/22/11	0	ACCEPT
04676-051		0	05/12/11	05/22/11	0	ACCEPT
04676-053		0	05/12/11	05/22/11	0	ACCEPT
04676-055		0	05/12/11	05/22/11	0	ACCEPT
04676-056		0	05/12/11	05/22/11	0	ACCEPT
04676-058		0	05/12/11	05/22/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp:	4°C
Preservation:	
Handling Time:	

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.498 mg/L Lab value : 100 % recovery

True CCS value : 0.500 mg/L

Calculated value = 99.6
(Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/13/11 (H₂O), 05/21/11 and 05/22/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : 04676-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : Soil samples for SDG 04630 were extracted in two discrete prep batches (AP011- 0054 and
-0055). Method (prep) blanks for all batches were non-detect (ND) for Cr⁺⁶.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the pre-digestion spike analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the pre-digestion spike analysis performed on a field sample ?

If No, qualify all associated samples.

3. Was the pre-digestion spike analysis performed at the proper concentration ?

If No, list action : _____

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?

If No, list action :

Sample ID	Sol.Recov.	Insol.Recov.	Ox / Red ?
04676-35	41%	83%	R
re-analysis	39%	84%	
04676-37	22%	89%	R
re-analysis	35%	88%	

004676-35 : sample shows reducing tendency based on ORP. Reject 'R' associated batch samples (02-35). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

04676-37 : sample shows reducing tendencies based on ORP. Reject 'R' associated batch samples (37-58). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike Sample ID: 04676-35
 Lab spiked sample value : 20.5
 Lab un-spiked sample value : 0.0
 Spike added concentration : 50.3

Calculated value = 40.8 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 41 % recovery

Verified ? yes

b. Insoluble Spike Sample ID: 04676-37
 Lab spiked sample value : 957
 Lab un-spiked sample value : 0.0
 Spike added concentration : 1070

Calculated value = 89.4 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 89 % recovery

Verified ? yes

6. Specific comments : NJDEP SOP No. 5.A.10, Rev.3 specifies data qualification actions based upon batch spike recoveries. Data usability is addressed in the data validation narrative.

**Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium**

PVS analysis performed on sample(s) : 04676-35
04676-37

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

	<u>YES</u>	<u>NO</u>
1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)	<input type="checkbox" value="X"/>	
If No, note deviations and action : _____		

2. Was the PVS analysis performed on a field sample ?	<input type="checkbox" value="X"/>	
If No, qualify all associated samples.		

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?	<input type="checkbox" value="X"/>	
If No, list action : _____		

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?	<input type="checkbox" value="n/a"/>	
If No, list action : _____		

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?	<input type="checkbox" value="n/a"/>	
If No, list action : _____		

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04676-35
 Lab spiked sample value : 44.5
 Lab un-spiked sample value : 0.0
 Spike added concentration : 50.3

Calculated value = 88.5 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 88 % recovery

Verified ? yes

Sample ID: 04676-37
 Lab spiked sample value : 41.7
 Lab un-spiked sample value : 0.0
 Spike added concentration : 44.6

Calculated value = 93.5 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 93 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04676-35 _____
04676-37 _____

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES

NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04676-35
Lab sample value : ND
Lab duplicate value : ND

Sample ID: 04676-37
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

Calculated value = no calc % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : ND = Not Detected

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES NO

1. Was the LCS performed at the correct frequency ?

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ?

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.8 Lab value : 94 % Recovery
LCS true value : 40.0 Calculated value = 94.5 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : Soil samples were extracted in two separate batches; a soil LCS was
prepared and analyzed for each extraction batch. All LCS recoveries
were within acceptable limits of 80 - 120%.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | YES | NO |
|--|------------------------------------|----|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04676-35

Sample dry weight <u>3.99</u>	Lab value : <u>79.5</u> % Solids
Sample wet weight <u>5.02</u>	
Calculated % Solids = <u>79.5</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.4068</u> mg/L	Sample ID: <u>04676-35 Soluble Spike</u>
% Solids = <u>79.5</u> %	Lab value : <u>20.5</u> mg/Kg
	Calculated value = <u>20.5</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	<u>0.40683427</u>	<u>0.100</u>	<u>1.0</u>	=	20.470
	<u>0.0025</u>	<u>0.795</u>			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

12 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04702

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04702

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04702-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051311-1	001	A	05/13/11	X	05/13/11	n/a	05/13/11
MC_	012V_8.5	004	S	05/13/11	X	05/16/11	05/24/11	05/24/11
MC_	012V_10.5	005	S	05/13/11	X	05/16/11	05/24/11	05/24/11
MC_	008Z_5.5	010	S	05/13/11	X	05/16/11	05/24/11	05/24/11
MC_	008Z_8.0	011	S	05/13/11	X	05/16/11	05/24/11	05/24/11
MC_	REP051311-1	014	S	05/13/11	X	05/16/11	05/24/11	05/24/11

S = Non-Aqueous Matrix

Total Samples = 6

A = Aqueous Matrix

Soil samples were received three days after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

Cr⁺⁶ was not detected in Field Blank FB-051311-1.

Samples (REP051311-1 and MC_008Z_5.5) were identified as a collocated field duplicate pair for this sample group. Results for Cr⁺⁶ in both samples within this field duplicate pair were reported as non-detect.

SECTION D pH / Eh (ORP)

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

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

Dresdner-Robin

Mr. John Tregidgo

12 July, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/12/11

SDG No.: E11-04702

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/12/2011

Check one: Lab ID 04702-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04702-	1	A	05/13/11	05/13/11	0	ACCEPT
04702-	4	S	05/13/11	05/24/11	0	ACCEPT
04702-	5	S	05/13/11	05/24/11	0	ACCEPT
04702-	10	S	05/13/11	05/24/11	0	ACCEPT
04702-	11	S	05/13/11	05/24/11	0	ACCEPT
04702-	14	S	05/13/11	05/24/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS) for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? [X] (I.e., Blank + 4 conc. Levels; r^2 >0.995 ?) If No, explain and list action :

2. Was the CCS analyzed at the proper frequency ? [X] (Beginning of run, after each 10 samples, end of run.) If No, explain and list action :

3. Was the same CCS concentration used throughout the analysis ? [X] If No, list action :

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? [X] If No, list % recovery, and action :

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard. Lab CCS value : 0.500 mg/L Lab value : 100 % recovery True CCS value : 0.500 mg/L Calculated value = 100.0 (Lab / True x 100)

6. Specific comments : Initial calibrations were performed on 05/13/11 (H2O), and 05/24/11 (soils). Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : 04702-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : All SDG soil samples.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the pre-digestion spike analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the pre-digestion spike analysis performed on a field sample ?

If No, qualify all associated samples.

3. Was the pre-digestion spike analysis performed at the proper concentration ?

If No, list action : _____

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike Sample ID: 04784-04
 Lab spiked sample value : 38.7
 Lab un-spiked sample value : 0.61
 Spike added concentration : 48.3

Calculated value = 78.9 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 79 % recovery

Verified ? yes

b. Insoluble Spike Sample ID: 04784-04
 Lab spiked sample value : 1040
 Lab un-spiked sample value : 0.61
 Spike added concentration : 1160

Calculated value = 89.6 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 90 % recovery

Verified ? yes

6. Specific comments : The batch matrix spike for this SDG was not from SDG samples, but was from a site within the project area; therefore the sample matrix may be considered as representative of this SDG.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04784-04

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04784-04
Lab spiked sample value : 42.8
Lab un-spiked sample value : 0.61
Spike added concentration : 48.3

Calculated value = 87.3 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 87 % recovery

Verified ? yes

Sample ID: _____
Lab spiked sample value : _____
Lab un-spiked sample value : _____
Spike added concentration : _____

Calculated value = #DIV/0! % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : _____ % recovery

Verified ? _____

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04784-04 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES

NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04784-04
Lab sample value : 0.61
Lab duplicate value : 0.70

Sample ID: _____
Lab sample value : _____
Lab duplicate value : _____

Calculated value = no calc % RPD

Calculated value = _____ % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : The absolute difference value between the duplicate samples is < 2 ppm.

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES NO

1. Was the LCS performed at the correct frequency ? X

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ? X

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.7
LCS true value : 40.0

Lab value : 94 % Recovery
Calculated value = 94.3 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04784-04

Sample dry weight <u>4.00</u>	Lab value : <u>82.8</u> % Solids
Sample wet weight <u>4.83</u>	
Calculated % Solids = <u>82.8</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.8012</u> mg/L	Sample ID: <u>04784-04 Soluble Spike</u>
% Solids = <u>82.8</u> %	Lab value : <u>38.7</u> mg/Kg
	Calculated value = <u>38.7</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	<u>0.80121125</u>	<u>0.100</u>	<u>1.0</u>	=	38.706
	<u>0.0025</u>	<u>0.828</u>			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

12 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04784

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04784

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04784-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051611-1	1	A	05/16/11	X	05/16/11	n/a	05/16/11
MC_	004XW_3.0	4	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	004XW_6.5	5	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	004XW_9.0	6	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	007V_9.5	8	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	007Z_1.5	9	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	007Z_5.5	10	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	007Z_8.0	11	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	008V_6.5	17	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	008V_8.0	18	S	05/16/11	X	05/17/11	05/24/11	05/24/11
MC_	REP051611-1	21	S	05/16/11	X	05/17/11	05/24/11	05/24/11

S = Non-Aqueous Matrix

Total Samples = 11

A = Aqueous Matrix

Soil samples were received one day after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

Cr⁺⁶ was not detected in Field Blank FB-051611-1.

Samples (REP051611-1 and MC_008V_6.5) were identified as a collocated field duplicate pair for this sample group. Results for Cr⁺⁶ in both samples within this field duplicate pair were reported as non-detect.

SECTION D pH / Eh (ORP)

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

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

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/12/11

SDG No.: E11-04784

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/12/2011

Check one: Lab ID 04784-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04784-	1	A	05/16/11	05/16/11	0	ACCEPT
04784-	4	S	05/16/11	05/24/11	0	ACCEPT
04784-	5	S	05/16/11	05/24/11	0	ACCEPT
04784-	6	S	05/16/11	05/24/11	0	ACCEPT
04784-	8	S	05/16/11	05/24/11	0	ACCEPT
04784-	9	S	05/16/11	05/24/11	0	ACCEPT
04784-	10	S	05/16/11	05/24/11	0	ACCEPT
04784-	11	S	05/16/11	05/24/11	0	ACCEPT
04784-	17	S	05/16/11	05/24/11	0	ACCEPT
04784-	18	S	05/16/11	05/24/11	0	ACCEPT
04784-	21	S	05/16/11	05/24/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4°C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
 (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
 If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
 (Beginning of run, after each 10 samples, end of run.)
 If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
 If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
 If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.500 mg/L Lab value : 100 % recovery

True CCS value : 0.500 mg/L

Calculated value = 100.0
 (Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/16/11 (H₂O), and 05/24/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the pre-digestion spike analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the pre-digestion spike analysis performed on a field sample ?

If No, qualify all associated samples.

3. Was the pre-digestion spike analysis performed at the proper concentration ?

If No, list action : _____

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?

5. Show calculation for pre-digestion spike recovery for Cr +6

a. Soluble Spike	Sample ID: <u>04784-04</u>
Lab spiked sample value :	<u>38.7</u>
Lab un-spiked sample value :	<u>0.61</u>
Spike added concentration :	<u>48.3</u>

Calculated value = 78.9 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 79 % recovery

Verified ? yes

b. Insoluble Spike	Sample ID: <u>04784-04</u>
Lab spiked sample value :	<u>1040</u>
Lab un-spiked sample value :	<u>0.61</u>
Spike added concentration :	<u>1160</u>

Calculated value = 89.6 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 90 % recovery

Verified ? yes

6. Specific comments : _____

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04784-04

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04784-04
Lab spiked sample value : 42.8
Lab un-spiked sample value : 0.61
Spike added concentration : 48.3

Calculated value = 87.3 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 87 % recovery

Verified ? yes

Sample ID: _____
Lab spiked sample value : _____
Lab un-spiked sample value : _____
Spike added concentration : _____

Calculated value = #DIV/0! % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : _____ % recovery

Verified ? _____

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04784-04 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES

NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04784-04
Lab sample value : 0.61
Lab duplicate value : 0.70

Sample ID: _____
Lab sample value : _____
Lab duplicate value : _____

Calculated value = no calc % RPD

Calculated value = _____ % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : The absolute difference value between the duplicate samples is < 2 ppm.

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES

NO

1. Was the LCS performed at the correct frequency ? X

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ? X

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.7
LCS true value : 40.0

Lab value : 94 % Recovery

Calculated value = 94.3 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04784-04

Sample dry weight <u>4.00</u>	Lab value : <u>82.8</u> % Solids
Sample wet weight <u>4.83</u>	
Calculated % Solids = <u>82.8</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.0127</u> mg/L	Sample ID: <u>04784-04</u>
% Solids = <u>82.8</u> %	Lab value : <u>0.610</u> mg/Kg
	Calculated value = <u>0.613</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>			
Sample Conc., mg/Kg =	0.01269429	0.100	1.0	=	0.613	
	0.0025	0.828			<i>mg/Kg</i>	
	<i>wetwt, Kg</i>	<i>%sol/100</i>				

Result verified ?

OK - rounding

12 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04821

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04821

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr^{+6}) samples were analyzed using SW-846 methods 3060A and 7196A. Oxidation / Reduction Potential (ORP) characteristics were determined by measurement of pH / Eh values for samples and subsequent extrapolation against the $\text{HCrO}_4^- / \text{Cr}(\text{OH})_3$ phase diagram; pH and Eh values were measured by Standard Methods 4500H-B and 2580B, respectively.

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

Sample Prefix	Sample ID	Lab ID E11-04821-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB-051711-1	001	A	05/17/11	X	05/17/11	n/a	05/17/11
MC_	001ZA_5.0	003	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	001ZA_7.5	004	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	002Z_4.5	008	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	002Z_8.0	009	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	003Z_7.5	012	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	003Z_8.5	013	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	004Z_7.0	017	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	004Z_8.0	018	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	006Z_3.5	022	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	006Z_7.0	023	S	05/17/11	X	05/18/11	05/26/11	05/26/11
MC_	REP051711	026	S	05/17/11	X	05/18/11	05/26/11	05/26/11

S = Non-Aqueous Matrix

Total Samples = 12

A = Aqueous Matrix

Soil samples were received one day after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

Cr⁺⁶ was not detected in Field Blank FB-051711-1.

Matrix spike recoveries for soluble and insoluble Cr⁺⁶ in batch QC sample E11-04821-003 (MC_001ZA_5.0) were below the allowable limit of 75% in both initial and re-analyses, as tabulated below. All associated batch samples were re-digested and re-analyzed with the batch spike samples, per NJDEP and method protocols.

Sample ID	Sol.Recov.	Insol.Recov.
04821-003	0%	19%
re-analysis	0%	38%

- QA Action: Qualify Cr⁺⁶ results in batch samples associated with E11-04821-003 (all soil samples) as rejected, 'R', per NJDEP SOP No. 5.A.10, Rev.3, Sect. VI.(D).7.D.8)e).
- Data Usability: Eh / pH results were evaluated to determine ReDox characteristics of batch samples as an indicator of ability to support Cr⁺⁶. All SDG Cr⁺⁶ samples were characterized as "Reducing" based upon the Method 3060A, Table 2 phase diagram.
The samples designated as "reducing" are not likely to support the presence of Cr⁺⁶, or if positive, are likely to exhibit low bias.

Samples (REP051711 and MC_002Z_8.0) were identified as a collocated field duplicate pair for this sample group. Results for Cr⁺⁶ in both samples within this field duplicate pair were reported as non-detect.

SECTION D pH / Eh (ORP)

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

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

SECTION E Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/12/11

SDG No.: E11-04821

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/12/2011

Check one: Lab ID 04630-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04630-	1	A	05/17/11	05/17/11	0	ACCEPT
04630-	3	S	05/17/11	05/26/11	0	ACCEPT
04630-	4	S	05/17/11	05/26/11	0	ACCEPT
04630-	8	S	05/17/11	05/26/11	0	ACCEPT
04630-	9	S	05/17/11	05/26/11	0	ACCEPT
04630-	12	S	05/17/11	05/26/11	0	ACCEPT
04630-	13	S	05/17/11	05/26/11	0	ACCEPT
04630-	17	S	05/17/11	05/26/11	0	ACCEPT
04630-	18	S	05/17/11	05/26/11	0	ACCEPT
04630-	22	S	05/17/11	05/26/11	0	ACCEPT
04630-	23	S	05/17/11	05/26/11	0	ACCEPT
04630-	26	S	05/17/11	05/26/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.493 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 98.64
(Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/17/11 (H₂O), and 05/26/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : 04821-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
 Check one (X) X
 Units : mg/Kg mg/L
 X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
 X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
 Yes : < or = MDL
 No : > MDL

Associated samples : All SDG soil samples.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|------------------------------------|
| 1. Was the pre-digestion spike analysis performed at the correct frequency ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, note deviations and action : _____ | | |
| _____ | | |
| 2. Was the pre-digestion spike analysis performed on a field sample ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, qualify all associated samples. | | |
| 3. Was the pre-digestion spike analysis performed at the proper concentration ? | <input type="checkbox" value="X"/> | <input type="checkbox"/> |
| If No, list action : _____ | | |
| _____ | | |
| 4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ? | <input type="checkbox"/> | <input type="checkbox" value="X"/> |

If No, list action :

Sample ID	Sol.Recov.	Insol.Recov	Ox / Red ?
04821-003	0%	19%	R
re-analysis	0%	38%	

004821-003 : sample shows reducing tendency based on ORP. Reject 'R' associated batch samples (03-26). Refer to validation narrative for data usability information based on batch sample ORP characteristics.

5. Show calculation for pre-digestion spike recovery for Cr +6
- | | |
|---|---|
| <p>a. Soluble Spike Sample ID: <u>04821-3</u></p> <p>Lab spiked sample value : <u>0.0</u></p> <p>Lab un-spiked sample value : <u>0.0</u></p> <p>Spike added concentration : <u>48.1</u></p>
<p>Calculated value = <u>0.0</u> % recovery
 (Spiked - Unspiked) / Spike Added x 100)</p> <p>Lab value : <u>0</u> % recovery</p> <p>Verified ? <u>yes</u></p> | <p>b. Insoluble Spike Sample ID: <u>04821-3</u></p> <p>Lab spiked sample value : <u>226</u></p> <p>Lab un-spiked sample value : <u>0.0</u></p> <p>Spike added concentration : <u>1170</u></p>
<p>Calculated value = <u>19.3</u> % recovery
 (Spiked - Unspiked) / Spike Added x 100)</p> <p>Lab value : <u>19</u> % recovery</p> <p>Verified ? <u>yes</u></p> |
|---|---|

6. Specific comments : NJDEP SOP No. 5.A.10, Rev.3 specifies data qualification actions based upon batch spike recoveries. Data usability is addressed in the data validation narrative.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04821-3

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

X

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

X

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

X

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

n/a

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04821-3
Lab spiked sample value : 43.6
Lab un-spiked sample value : 0.0
Spike added concentration : 48.1

Calculated value = 90.6 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 91 % recovery

Verified ? yes

Sample ID: _____
Lab spiked sample value : _____
Lab un-spiked sample value : _____
Spike added concentration : _____

Calculated value = #DIV/0! % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : _____ % recovery

Verified ? _____

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04821-3 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04821-3
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

 $\% \text{ RPD} = \frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

Sample ID: 04821-3
Lab sample value : ND
Lab duplicate value : ND

Calculated value = no calc % RPD

 $\% \text{ RPD} = \frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : ND = Not Detected

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES NO

1. Was the LCS performed at the correct frequency ? X

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ? X

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 36.8
LCS true value : 40.0

Lab value : 92 % Recovery
Calculated value = 92.0 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04821-22

Sample dry weight <u>4.93</u>	Lab value : <u>85.1</u> % Solids
Sample wet weight <u>5.79</u>	
Calculated % Solids = <u>85.1</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.2039</u> mg/L	Sample ID: <u>04821-22</u>
% Solids = <u>85.1</u> %	Lab value : <u>9.58</u> mg/Kg
	Calculated value = <u>9.58</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	<u>0.20385228</u>	<u>0.100</u>	<u>1.0</u>	=	9.582
	<u>0.0025</u>	<u>0.851</u>			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

13 July, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: JCRA – Morris Canal, Laboratory Case NO. E11- 04868

Dear Mr. Tregidgo,

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

Site Name: JCRA – Morris Canal

Fractions

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

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04868

Matrix: Non-Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

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

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

Sample Prefix	Sample ID	Lab ID E11-04868-	Matrix	Date Collected	Analysis	Cr ⁺⁶	Cr ⁺⁶	Cr ⁺⁶
					Hex Cr	Date Rec'd	Prep Date	RunDate
---	FB051811	001	A	05/18/11	X	05/18/11	n/a	05/18/11
MC-	006X_1.5	002	S	05/18/11	X	05/19/11	06/07/11	06/07/11
MC-	006X_3.5	003	S	05/18/11	X	05/19/11	05/26/11	05/27/11
MC-	006X_7.5	005	S	05/18/11	X	05/19/11	05/26/11	05/27/11
MC-	<i>REP051811-1</i>	006	S	05/18/11	X	05/19/11	05/26/11	05/27/11
MC-	<i>006X_11.5</i>	008	S	05/18/11	X	05/19/11	05/26/11	05/27/11
MC-	006X_13.5	009	S	05/18/11	X	05/19/11	05/26/11	05/27/11
MC-	006X_17.5	011	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	B1_1.0	012	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	B1_5.5	014	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	B1_8.5	016	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	<i>B1_13.5</i>	017	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	<i>REP051811-2</i>	018	S	05/18/11	X	05/19/11	05/26/11	05/27/11
207_	B1_17.5	020	S	05/18/11	X	05/19/11	05/26/11	05/27/11

S = Non-Aqueous Matrix

Total Samples = 14

A = Aqueous Matrix

Soil samples were received one day after collection, while associated field blanks were received on the same day as collection due to the short (24-hour) holding time for aqueous hexavalent chromium samples. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

It is noted that sample E11-04868-002 (MC-006X_1.5) was extracted separately from the remainder of this SDG's soil samples. The batch QC spike associated with this sample was not of this SDG, and may not be representative of this sample's / SDG's matrix characteristics. Although the batch QC spike failed recovery (both initially and on re-extraction / re-analysis), no QA action was taken for MC-006X_1.5, because of the noted uncertainty of matrix representativeness.

Cr⁺⁶ was not detected in Field Blank FB-051811.

Samples (REP051811-1 and MC-006X_11.5) and (REP051811-2 and 207_B1_13.5) were identified as collocated field duplicate pairs for this sample group. (REP051811-2 and 207_B1_13.5) were reported as non-detects. (REP051811-1 and MC-006X_11.5) exhibited positive Cr⁺⁶ concentrations of 4190 and 3150 mg/Kg, respectively, yielding a calculated RPD value of 25.2%, which is below the EPA regional DV guidance threshold for qualification for soil samples of 35% RPD. No QA action was necessary.

SECTION D
pH / Eh (ORP)

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

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

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 3060 7196A

Date of Review: 07/13/11

SDG No.: E11-04868

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input checked="" type="checkbox"/>		F. Non-Conformance Summary ?	<input checked="" type="checkbox"/>	
B. Paginated ?	<input checked="" type="checkbox"/>		G. Methodology Review ?	<input checked="" type="checkbox"/>	
C. Title Page ?	<input checked="" type="checkbox"/>		H. Uninitialed Strikeover ?		<input checked="" type="checkbox"/>
D. Table of Contents ?	<input checked="" type="checkbox"/>		I. Legible Xerox ?	<input checked="" type="checkbox"/>	
E. Chain of Custody ?	<input checked="" type="checkbox"/>		J. Consistent Dates ?	<input checked="" type="checkbox"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 7/13/2011

Check one: Lab ID 04868	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04868	001	A	05/18/11	05/18/11	0	ACCEPT
04868	2	S	05/18/11	06/07/11	0	ACCEPT
04868	3	S	05/18/11	05/27/11	0	ACCEPT
04868	5	S	05/18/11	05/27/11	0	ACCEPT
04868	6	S	05/18/11	05/27/11	0	ACCEPT
04868	8	S	05/18/11	05/27/11	0	ACCEPT
04868	9	S	05/18/11	05/27/11	0	ACCEPT
04868	11	S	05/18/11	05/27/11	0	ACCEPT
04868	12	S	05/18/11	05/27/11	0	ACCEPT
04868	14	S	05/18/11	05/27/11	0	ACCEPT
04868	16	S	05/18/11	05/27/11	0	ACCEPT
04868	17	S	05/18/11	05/27/11	0	ACCEPT
04868	18	S	05/18/11	05/27/11	0	ACCEPT
04868	20	S	05/18/11	05/27/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp: 4°C

Preservation:

Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.492 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 98.5
(Lab / True x 100)

6. Specific comments :

Initial calibrations were performed on 05/18/11 (H₂O), 05/27/11 and 06/07/11 (soils).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : 04868-001

HEXCR - 5b

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : Soil samples for SDG 04868 were extracted in two discrete prep batches (AP011- 0064 and -0068). Method (prep) blanks for all batches were non-detect (ND) for Cr⁺⁶.

Pre-digestion Spike Analysis for Non-Aqueous Hexavalent Chromium Samples

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All SDG soil samples

	<u>YES</u>	<u>NO</u>
1. Was the pre-digestion spike analysis performed at the correct frequency ?	<input type="checkbox" value="X"/>	
If No, note deviations and action : _____		

2. Was the pre-digestion spike analysis performed on a field sample ?	<input type="checkbox" value="X"/>	
If No, qualify all associated samples.		
3. Was the pre-digestion spike analysis performed at the proper concentration ?	<input type="checkbox" value="X"/>	
If No, list action : _____		

4. Did the pre-digestion spike recovery for Cr +6 meet the criteria of 75 - 125% ?	<input type="checkbox" value="X"/>	
If No, list action :		
<u>004868-2 : this SDG sample was extracted in a separate batch from other soils, with a batch QC sample which was not from this SDG. Therefore, the matrix may not be representative of this SDG's sample matrix. The sample was re-extracted and re-analyzed along with the same batch QC and failed recovery. No QA action was taken, based on uncertainty of matrix representativeness.</u>		

5. Show calculation for pre-digestion spike recovery for Cr +6		
a. Soluble Spike Sample ID: <u>04868-3</u> Lab spiked sample value : <u>14400</u> Lab un-spiked sample value : <u>4820.0</u> Spike added concentration : <u>9790.0</u> Calculated value = <u>97.9</u> % recovery (Spiked - Unspiked) / Spike Added x 100) Lab value : <u>98</u> % recovery Verified ? <u>yes</u>	b. Insoluble Spike Sample ID: <u>04868-3</u> Lab spiked sample value : <u>6440</u> Lab un-spiked sample value : <u>4820.0</u> Spike added concentration : <u>2050</u> Calculated value = <u>79.0</u> % recovery (Spiked - Unspiked) / Spike Added x 100) Lab value : <u>79</u> % recovery Verified ? <u>yes</u>	
6. Specific comments :	_____	

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04868-3

Matrix : Non-Aqueous

% Solids : n/a

Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

If No, note deviations and action : _____

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04868-3
Lab spiked sample value : 14500
Lab un-spiked sample value : 4820
Spike added concentration : 9790

Calculated value = 98.9 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 99 % recovery

Verified ? yes

Sample ID: _____
Lab spiked sample value : _____
Lab un-spiked sample value : _____
Spike added concentration : _____

Calculated value = #DIV/0! % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : _____ % recovery

Verified ? _____

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample(s) : 04868-3 _____

Matrix : Non-Aqueous
Units : mg/Kg

Associated samples : All SDG soil samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04868-3
Lab sample value : 4820
Lab duplicate value : 4920

Sample ID: _____
Lab sample value : _____
Lab duplicate value : _____

Calculated value = 2.1 % RPD

Calculated value = _____ % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2}$ x 100

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2}$ x 100

5. Specific comments : _____

Laboratory Control Sample (LCS)

Matrix : Non-Aqueous

Units : mg/Kg

Associated samples : All soil samples.

YES

NO

1. Was the LCS performed at the correct frequency ?

If No, note deviations and action : _____

2. Does the LCS meet the QC limit of 80 - 120% ?

If No, list the %Recovery and action taken. _____

3 Show calculation for LCS recovery for Cr+6.

Lab LCS value : 37.5
LCS true value : 40.0

Lab value : 94 % Recovery

Calculated value = 93.8 % Recovery

$$\% \text{ Recovery} = \frac{\text{Laboratory LCS result}}{\text{LCS true value}} \times 100$$

5. Specific comments : Soil samples were extracted in two separate batches; a soil LCS was
prepared and analyzed for each extraction batch. All LCS recoveries
were within acceptable limits of 80 - 120%.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|------------------------------------|-----------|
| 1. Were all samples reported within the calibration range?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 2. Was the raw data free of any anomalies ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 3. Was the data package free of any computational or transcription errors ?
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 4. Were both 3060 and 7196A pH readings provided for all samples, and within the method requirements ?
(Method 3060 : non-aqueous samples must be adjusted to pH 7.0 - 8.0)
(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |
| 5. Were hotplate temperatures provided, and within method requirements ?
(At least 60 minutes, and between 90 to 95 degrees C)
If No, list affected samples and action : _____
_____ | <input type="checkbox" value="X"/> | |

6. Show the calculation for % Solids for one sample. Sample ID: 04868-3

Sample dry weight <u>2.67</u>	Lab value : <u>53.0</u> % Solids
Sample wet weight <u>5.04</u>	
Calculated % Solids = <u>53.0</u>	% Solids = $\frac{\text{Sample dry weight}}{\text{Sample wet weight}} \times 100$

7. Verify that non-aqueous samples were reported on a dry-weight basis by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : <u>0.6382</u> mg/L	Sample ID: <u>04868-3</u>
% Solids = <u>53.0</u> %	Lab value : <u>4820</u> mg/Kg
	Calculated value = <u>4816</u> mg/Kg

	<i>curve mg/L</i>	<i>dig.vol, L</i>	<i>dilution</i>		
Sample Conc., mg/Kg =	0.63816835	0.100	100.0	=	4816.365
	0.0025	0.530			<i>mg/Kg</i>
	<i>wetwt, Kg</i>	<i>%sol/100</i>			

Result verified ?

26 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 04232

Dear Mr. Tregidgo,

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

Site Name: Morris Canal

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04232

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

The laboratory deliverables initially provided did not contain raw QC or calibration / sample results. An expanded report was requested from the laboratory and received on 08/25/2011.

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

Sample ID Client	Lab ID 04232-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-8-1	001	A	05/02/11	X	05/02/11	05/03/11
MW-7-1	002	A	05/02/11	X	05/02/11	05/03/11
MW-7-2	003	A	05/02/11	X	05/02/11	05/03/11
MW-3-1	004	A	05/02/11	X	05/02/11	05/03/11
FB050211	005	A	05/02/11	X	05/02/11	05/03/11
REP050211	006	A	05/02/11	X	05/02/11	05/03/11

A = Aqueous Matrix

Total Samples = 6

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 50 ug/L. It is noted that the batch QC spike sample was not from this SDG; although spike recovery was acceptable, this sample may not be representative of this SDG's matrix characteristics. No action was taken.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB050211.

For this SDG, REP050211 was identified as a field duplicate of MW-3-1. Results for both collocated samples were non-detects (U).

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal Job Code: n/a
 Location: --- Site Manager: n/a
 Laboratory Name : IAL Lead Division / Bureau: n/a
 Reviewer : Chris Taylor Methodology: 7196A
 Date of Review: 08/13/11 08/26/11 SDG No.: E11-04232

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : The initial data deliverables package did not contain raw QC or calibration results. An expanded deliverables package was received on 08/25/11.

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/13/2011

Check one: Lab ID 04232-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04232-001		A	05/02/11	05/03/11	0	ACCEPT
04232-002		A	05/02/11	05/03/11	0	ACCEPT
04232-003		A	05/02/11	05/03/11	0	ACCEPT
04232-004		A	05/02/11	05/03/11	0	ACCEPT
04232-005		A	05/02/11	05/03/11	0	ACCEPT
04232-006		A	05/02/11	05/03/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4° C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

	<u>YES</u>	<u>NO</u>
1. Was the instrument properly standardized ? (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?) If No, explain and list action : _____ _____	<input checked="checked" type="checkbox" value="X"/>	
2. Was the CCS analyzed at the proper frequency ? (Beginning of run, after each 10 samples, end of run.) If No, explain and list action : _____ _____	<input checked="checked" type="checkbox" value="X"/>	
3. Was the same CCS concentration used throughout the analysis ? If No, list action : _____ _____	<input checked="checked" type="checkbox" value="X"/>	
4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? If No, list % recovery, and action : _____ _____	<input checked="checked" type="checkbox" value="X"/>	
5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard. Lab CCS value : <u>0.4943</u> mg/L Lab value : <u>99</u> % recovery True CCS value : <u>0.500</u> mg/L Calculated value = <u>98.9</u> (Lab / True x 100)		
6. Specific comments : <u>Initial calibration was performed on 05/03/11 (H₂O).</u> <u>Reported results were verified at random from the raw data; no disparities were noted.</u>		

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04226-004

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples. See Comments below.

- | | <u>YES</u> | <u>NO</u> |
|--|-------------------------------------|-------------------------------------|
| <p>1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)</p> <p>If No, note deviations and action : <u>The native sample concentration was 'ND' (not detected), and spike added concentration 50 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.</u></p> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <p>2. Was the PVS analysis performed on a field sample ?</p> <p>If No, qualify all associated samples.</p> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <p>3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?</p> <p>If No, list action : _____</p> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <p>3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?</p> <p>If No, list action : _____</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?</p> <p>If No, list action : _____</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>5. Show calculation for PVS % recovery for Cr +6.</p> <p>Sample ID: <u>04226-004</u></p> <p>Lab spiked sample value : <u>50</u> ug/L</p> <p>Lab un-spiked sample value : <u>U</u> ug/L</p> <p>Spike added concentration : <u>50</u> ug/L</p> <p>Calculated value = <u>100.0</u> % recovery
(Spiked - Unspiked) / Spike Added x 100)</p> <p>Lab value : <u>100</u> % recovery</p> <p>Verified ? <u>yes</u></p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>6. Specific comments : <u>The batch QC spike was not from this SDG and may not represent this SDG's matrix characteristics.</u></p> | <input type="checkbox"/> | <input type="checkbox"/> |

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 04226-004 _____

Matrix : Water _____
Units : ug/L _____

Associated samples : All aqueous SDG samples. See Comments below.

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04226-004
Lab sample value : 50 ug/L
Lab duplicate value : 49 ug/L

Sample ID: _____
Lab sample value : _____ ug/L
Lab duplicate value : _____ ug/L

Calculated value = 2.02 % RPD

Calculated value = #DIV/0! % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : The batch QC duplicate was not from this SDG and may not represent
this SDG's matrix characteristics.

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.0940 mg/L

Sample ID: **04232-001**

Lab value : **0.940** mg/L

Calculated value = **0.940** mg/L

	<i>curve mg/L</i>	<i>dilution</i>			
Sample Conc., mg/L =	0.09395	10	=	0.940	<i>mg/L</i>

Result verified ? **Yes**

27 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 04283

Dear Mr. Tregidgo,

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

Site Name: Morris Canal

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04283

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

The laboratory deliverables initially provided did not contain raw QC or calibration / sample results. An expanded report was requested from the laboratory and received on 08/25/2011.

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

Sample ID Client	Lab ID 04283-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-3-2	001	A	05/03/11	X	05/03/11	05/04/11
MW-5-1	002	A	05/03/11	X	05/03/11	05/04/11
MW-6-1	003	A	05/03/11	X	05/03/11	05/04/11
MW-4-1	004	A	05/03/11	X	05/03/11	05/04/11
MW-5-2	005	A	05/03/11	X	05/03/11	05/04/11
MW-9-1	006	A	05/03/11	X	05/03/11	05/04/11
MW-12-1	007	A	05/03/11	X	05/03/11	05/04/11
REP050311	008	A	05/03/11	X	05/03/11	05/04/11
FB050311	009	A	05/03/11	X	05/03/11	05/04/11
TB050211	010	A	05/03/11	X	05/03/11	05/04/11

A = Aqueous Matrix

Total Samples = 10

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 50 ug/L.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB050311.

For this SDG, REP050311 was identified as a field duplicate of MW-6-1. Results for both collocated samples were non-detects (U).

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal Job Code: n/a
 Location: --- Site Manager: n/a
 Laboratory Name : IAL Lead Division / Bureau: n/a
 Reviewer : Chris Taylor Methodology: 7196A
 Date of Review: 08/15/11 08/27/11 SDG No.: E11-04283

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : The initial data deliverables package did not contain raw QC or calibration results. An expanded deliverables package was received on 08/25/11.

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/15/2011 #####

Check one: Lab ID 04283-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04283-001		A	05/03/11	05/04/11	0	ACCEPT
04283-002		A	05/03/11	05/04/11	0	ACCEPT
04283-003		A	05/03/11	05/04/11	0	ACCEPT
04283-004		A	05/03/11	05/04/11	0	ACCEPT
04283-005		A	05/03/11	05/04/11	0	ACCEPT
04283-006		A	05/03/11	05/04/11	0	ACCEPT
04283-007		A	05/03/11	05/04/11	0	ACCEPT
04283-008		A	05/03/11	05/04/11	0	ACCEPT
04283-009		A	05/03/11	05/04/11	0	ACCEPT
04283-010		A	05/03/11	05/04/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4° C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

	<u>YES</u>	<u>NO</u>
1. Was the instrument properly standardized ? (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?) If No, explain and list action : _____ _____	<input style="width: 80px; height: 20px;" type="checkbox" value="X"/>	
2. Was the CCS analyzed at the proper frequency ? (Beginning of run, after each 10 samples, end of run.) If No, explain and list action : _____ _____	<input style="width: 80px; height: 20px;" type="checkbox" value="X"/>	
3. Was the same CCS concentration used throughout the analysis ? If No, list action : _____ _____	<input style="width: 80px; height: 20px;" type="checkbox" value="X"/>	
4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? If No, list % recovery, and action : _____ _____	<input style="width: 80px; height: 20px;" type="checkbox" value="X"/>	
5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard. Lab CCS value : <u>0.4949</u> mg/L Lab value : <u>99</u> % recovery True CCS value : <u>0.500</u> mg/L Calculated value = <u>99.0</u> (Lab / True x 100)		
6. Specific comments : <u>Initial calibration was performed on 05/03/11 (H₂O).</u> <u>Reported results were verified at random from the raw data; no disparities were noted.</u>		

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04283-001

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples.

- | | <u>YES</u> | <u>NO</u> |
|--|--------------------------|-------------------------------------|
| 1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If No, note deviations and action : The native sample concentration was 'ND' (not detected), and spike added concentration 50 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.

- | | | |
|---|-------------------------------------|--|
| 2. Was the PVS analysis performed on a field sample ? | <input checked="" type="checkbox"/> | |
|---|-------------------------------------|--|

If No, qualify all associated samples.

- | | | |
|---|-------------------------------------|--|
| 3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ? | <input checked="" type="checkbox"/> | |
|---|-------------------------------------|--|

If No, list action : _____

- | | | |
|--|--------------------------|--------------------------|
| 3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ? | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ? n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04283-001
 Lab spiked sample value : 49 ug/L
 Lab un-spiked sample value : U ug/L
 Spike added concentration : 50 ug/L

Calculated value = 98.0 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 100 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 04283-001 _____

Matrix : Water
Units : ug/L

Associated samples : All aqueous SDG samples.

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04283-001
Lab sample value : 49 ug/L
Lab duplicate value : 50 ug/L

Sample ID: _____
Lab sample value : _____ ug/L
Lab duplicate value : _____ ug/L

Calculated value = 2.0 % RPD

Calculated value = #DIV/0! % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.0951 mg/L Sample ID: 04283-005
 Lab value : 2.38 mg/L
 Calculated value = 2.38 mg/L

	<i>curve mg/L</i>	<i>dilution</i>			
Sample Conc., mg/L =	0.09511	25	=	2.378	<i>mg/L</i>

Result verified ? **Yes**

27 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 04546

Dear Mr. Tregidgo,

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

Site Name: Morris Canal

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-04546

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

The laboratory deliverables initially provided did not contain raw QC or calibration / sample results. An expanded report was requested from the laboratory and received on 08/25/2011.

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

Sample ID Client	Lab ID 04546-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-10-1	001	A	05/09/11	X	05/09/11	05/10/11
REP050911	002	A	05/09/11	X	05/09/11	05/10/11
FB050911	003	A	05/09/11	X	05/09/11	05/10/11

A = Aqueous Matrix

Total Samples = 3

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 50 ug/L.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB050911.

REP050911 was identified as a field duplicate of MW-10-1. Hexavalent chromium was reported as not-detected in both collocated samples.

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

Dresdner-Robin

Mr. John Tregidgo

27 August, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal Job Code: n/a
 Location: --- Site Manager: n/a
 Laboratory Name : IAL Lead Division / Bureau: n/a
 Reviewer : Chris Taylor Methodology: 7196A
 Date of Review: 08/15/11 08/27/11 SDG No.: E11-04546

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : The initial data deliverables package did not contain raw QC or calibration results. An expanded deliverables package was received on 08/25/11.

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/15/2011

Check one: Lab ID 04546-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
04546-001		A	05/09/11	05/10/11	0	ACCEPT
04546-002		A	05/09/11	05/10/11	0	ACCEPT
04546-003		A	05/09/11	05/10/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4° C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.4998 mg/L Lab value : 100 % recovery

True CCS value : 0.500 mg/L

Calculated value = 100.0
(Lab / True x 100)

6. Specific comments :

Initial calibration was performed on 05/10/11 (H₂O).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water
Check one (X) X Preparation / Reagent Blank ID : PrepBlank

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	< or = MDL		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : All SDG aqueous Cr⁺⁶ samples.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 04564-001

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H₂O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)
- YES NO

If No, note deviations and action : The native sample concentration was 'ND' (not detected), and spike added concentration 50 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.

2. Was the PVS analysis performed on a field sample ?
- YES NO

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?
- YES NO

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?
- YES NO n/a

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

YES NO n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 04564-001
 Lab spiked sample value : 51 ug/L
 Lab un-spiked sample value : ND ug/L
 Spike added concentration : 50 ug/L

Calculated value = 102.0 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 102.0 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 04564-001 _____ Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples

YES

NO

1. Was the duplicate analysis performed at the correct frequency ? X

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ? X

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ? X

(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 04564-001
Lab sample value : 51 ug/L
Lab duplicate value : 53 ug/L

Sample ID: _____
Lab sample value : _____ ug/L
Lab duplicate value : _____ ug/L

Calculated value = 3.85 % RPD

Calculated value = #DIV/0! % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.0510 mg/L

Sample ID: **04564-001 S**

Lab value : 0.051 mg/L

Calculated value = 0.051 mg/L

	<i>curve mg/L</i>	<i>dilution</i>				
Sample Conc., mg/L =	0.05095	1	=	0.051		
				<i>mg/L</i>		

Result verified ? **Yes**

15 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 05682

Dear Mr. Tregidgo,

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

Site Name: Morris Canal (Berry Lane)

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-05682

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

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

Sample ID Client	Lab ID 05682-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-8-1	001	A	06/10/11	X	06/10/11	06/10/11
MW-7-2	002	A	06/10/11	X	06/10/11	06/10/11
MW-10-1	003	A	06/10/11	X	06/10/11	06/10/11
FB061011	004	A	06/10/11	X	06/10/11	06/10/11

A = Aqueous Matrix

Total Samples = 4

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 500 ug/L.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB061011.

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

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

Dresdner-Robin

Mr. John Tregidgo

15 August, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 7196A

Date of Review: 08/13/11

SDG No.: E11-05682

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/13/2011

Check one: Lab ID 05682-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
05682-001		A	06/10/11	06/10/11	0	ACCEPT
05682-002		A	06/10/11	06/10/11	0	ACCEPT
05682-003		A	06/10/11	06/10/11	0	ACCEPT
05682-004		A	06/10/11	06/10/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4° C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.5001 mg/L Lab value : 100 % recovery

True CCS value : 0.500 mg/L

Calculated value = 100.0
(Lab / True x 100)

6. Specific comments :

Initial calibration was performed on 06/10/11 (H₂O).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Preparation / Reagent Blank Summary
for Hexavalent Chromium

Associated sample matrix : Soil Water Preparation / Reagent Blank ID : PrepBlank
Check one (X) X

Units : mg/Kg mg/L
X

Did the frequency of the preparation / reagent blank analysis meet method requirements ? Yes No
X

If No, explain and note action : _____

CONCENTRATION	<u>< or = MDL</u>		COMMENTS / ACTION
	Yes	No	
U			

MDL Codes
Yes : < or = MDL
No : > MDL

Associated samples : All SDG aqueous Cr⁺⁶ samples.

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 05682-002

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H₂O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)
- YES NO

If No, note deviations and action : The native sample concentration was 'ND' (not detected), and spike added concentration 500 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.

2. Was the PVS analysis performed on a field sample ?
- YES NO

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?
- YES NO

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?
- YES NO n/a

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

YES NO n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 05682-002
 Lab spiked sample value : 493 ug/L
 Lab un-spiked sample value : ND ug/L
 Spike added concentration : 500 ug/L

Calculated value = 98.6 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 98.6 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 05682-002 _____

Matrix : Water
Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ?

If No, note deviations and action : _____

2. Was the duplicate analysis performed on a field sample ?

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ?
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action : _____

4. Show calculation for % RPD for Cr+6.

Sample ID: 05682-002
Lab sample value : 493 ug/L
Lab duplicate value : 490 ug/L

Sample ID: _____
Lab sample value : _____ ug/L
Lab duplicate value : _____ ug/L

Calculated value = 0.61 % RPD

Calculated value = #DIV/0! % RPD

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

% RPD = $\frac{\text{Sample} - \text{Duplicate}}{(\text{Sample} + \text{Duplicate})/2} \times 100$

5. Specific comments : _____

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.5898 mg/L

Sample ID: **05682-001**

Lab value : 1.18 mg/L

Calculated value = 1.18 mg/L

	<i>curve mg/L</i>	<i>dilution</i>			
Sample Conc., mg/L =	0.58976	2	=	1.180	<i>mg/L</i>

Result verified ? **Yes**

15 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 05759

Dear Mr. Tregidgo,

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

Site Name: Morris Canal (Berry Lane)

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-05759

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

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

Sample ID (Client)	Lab ID 05759-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-10-1-D	001	A	06/13/11	X	06/13/11	06/14/11
MW-3-2	002	A	06/13/11	X	06/13/11	06/14/11
MW-5-1	003	A	06/13/11	X	06/13/11	06/14/11
MW-9-1	004	A	06/13/11	X	06/13/11	06/14/11
FB061311	005	A	06/13/11	X	06/13/11	06/14/11

A = Aqueous Matrix

Total Samples = 5

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 500 ug/L.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB061311.

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

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

Dresdner-Robin

Mr. John Tregidgo

15 August, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 7196A

Date of Review: 08/13/11

SDG No.: E11-05759

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/13/2011

Check one: Lab ID 05759-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
05759-001		A	06/13/11	06/14/11	0	ACCEPT
05759-002		A	06/13/11	06/14/11	0	ACCEPT
05759-003		A	06/13/11	06/14/11	0	ACCEPT
05759-004		A	06/13/11	06/14/11	0	ACCEPT
05759-005		A	06/13/11	06/14/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

Cooler Temp:	4° C
Preservation:	
Handling Time:	

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
(I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
(Beginning of run, after each 10 samples, end of run.)
If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.4947 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

Calculated value = 98.9
(Lab / True x 100)

6. Specific comments :

Initial calibration was performed on 06/14/11 (H₂O).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for
Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 05759-001

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples

- | | <u>YES</u> | <u>NO</u> |
|--|--------------------------|-------------------------------------|
| 1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H2O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If No, note deviations and action : The native sample concentration was 'ND' (not detected), and spike added concentration 500 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.

- | | | |
|---|-------------------------------------|--|
| 2. Was the PVS analysis performed on a field sample ? | <input checked="" type="checkbox"/> | |
|---|-------------------------------------|--|

If No, qualify all associated samples.

- | | | |
|---|-------------------------------------|--|
| 3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ? | <input checked="" type="checkbox"/> | |
|---|-------------------------------------|--|

If No, list action : _____

- | | | |
|--|--------------------------|--------------------------|
| 3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ? | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ? n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6. _____

Sample ID: 05759-001
 Lab spiked sample value : 491 ug/L
 Lab un-spiked sample value : ND ug/L
 Spike added concentration : 500 ug/L

Calculated value = 98.2 % recovery
 (Spiked - Unspiked) / Spike Added x 100)

Lab value : 98.2 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 05759-001 S

Matrix : Water
Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ? [X]

If No, note deviations and action :

2. Was the duplicate analysis performed on a field sample ? [X]

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ? [X]
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action :

4. Show calculation for % RPD for Cr+6.

Sample ID: 05759-001 S
Lab sample value : 491 ug/L
Lab duplicate value : 495 ug/L
Calculated value = 0.81 % RPD
% RPD = (Sample - Duplicate) / ((Sample + Duplicate)/2) x 100

Sample ID:
Lab sample value : ug/L
Lab duplicate value : ug/L
Calculated value = #DIV/0! % RPD
% RPD = (Sample - Duplicate) / ((Sample + Duplicate)/2) x 100

5. Specific comments :

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.4910 mg/L

Sample ID: **05759-001 S**

Lab value : 0.491 mg/L

Calculated value = 0.491 mg/L

	<i>curve mg/L</i>	<i>dilution</i>			
Sample Conc., mg/L =	0.49095	1	=	0.491	<i>mg/L</i>

Result verified ? **Yes**

15 August, 2011

Dresdner-Robin Environmental Management
Att: Mr. John Tregidgo, Project Manager
371 Warren Street
Jersey City, New Jersey 07302

Re: Morris Canal, Laboratory Case NO. E11- 05788

Dear Mr. Tregidgo,

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

Site Name: Morris Canal (Berry Lane)

Fractions

Hexavalent chromium (Cr⁺⁶)

Laboratory: Integrated Analytical Laboratories, LLC

Case No.: E11-05788

Matrix: Aqueous

Reviewer: Chris Taylor

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

SECTION A
Sample Information

The above-noted Case Number samples were analyzed by Integrated Analytical Laboratories, LLC (IAL), Randolph, NJ (NJ Laboratory ID Cert. No. 14751). Hexavalent chromium (Cr⁺⁶) samples were analyzed using SW-846 method 7196A.

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

Sample ID Client	Lab ID 05788-	Matrix	Date Collected	Analysis	Cr+6 Date Rec'd	Cr+6 RunDate
				Hex Cr		
MW-7-1	001	A	06/14/11	X	06/14/11	06/15/11
MW-3-1	002	A	06/14/11	X	06/14/11	06/15/11
MW-5-2	003	A	06/14/11	X	06/14/11	06/15/11
MW-6-1	004	A	06/14/11	X	06/14/11	06/15/11
MW-12-1	005	A	06/14/11	X	06/14/11	06/15/11
REP061411	006	A	06/14/11	X	06/14/11	06/15/11
FB061411	007	A	06/14/11	X	06/14/11	06/15/11

A = Aqueous Matrix

Total Samples = 7

Samples were received on the same day as collection. Samples were received on ice at recorded temperature of 4°C.

SECTION C Hexavalent Chromium

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

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

For the aqueous spike sample, the spike added concentration should be the greater of 30 ug/L or 2x the native sample concentration. In this case, the native (unspiked) sample Cr⁺⁶ concentration was ND (not detected), and the sample was spiked with 500 ug/L.

QA Action:

- Qualify reported Cr⁺⁶ results for all SDG samples ('UJ' or 'J'), as quantitatively estimated RL values or estimated values; bias direction is indeterminate.

Cr⁺⁶ was not detected in Field Blank FB061411.

REP061411 was identified as a field duplicate of MW-12-1. Hexavalent chromium was reported as not-detected in both samples.

SECTION D pH / Eh (ORP)

No information regarding pH / Eh measurements were found in the deliverables forwarded to the reviewer. Therefore, the reviewer is unable to determine reductive or oxidative characteristics of the samples. These values are only used for data assessment purposes when Cr⁺⁶ sample spike recoveries are outside acceptable recovery ranges; reported spike recoveries were within specified limits.

Dresdner-Robin

Mr. John Tregidgo

15 August, 2011

SECTION E
Overall Recommendations

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

Very truly yours,
Environmental Quality Associates, Inc.

Chris W. Taylor
Vice President

Data Deliverable Requirements - Hexavalent Chromium

Site Name : Morris Canal

Job Code: n/a

Location: ---

Site Manager: n/a

Laboratory Name : IAL

Lead Division / Bureau: n/a

Reviewer : Chris Taylor

Methodology: 7196A

Date of Review: 08/15/11

SDG No.: E11-05788

Analysis for Hexavalent Chromium by Method : See Above

	Yes	No		Yes	No
A. Permanently Bound ?	<input type="text" value="n/a"/>		F. Non-Conformance Summary ?	<input type="text" value="X"/>	
B. Paginated ?	<input type="text" value="X"/>		G. Methodology Review ?	<input type="text" value="X"/>	
C. Title Page ?	<input type="text" value="X"/>		H. Uninitialed Strikeover ?		<input type="text" value="X"/>
D. Table of Contents ?	<input type="text" value="X"/>		I. Legible Xerox ?	<input type="text" value="X"/>	
E. Chain of Custody ?	<input type="text" value="X"/>		J. Consistent Dates ?	<input type="text" value="X"/>	

Describe any deviations from requirements : _____

Holding Times for Hexavalent Chromium

Site Name : Morris Canal

Laboratory Name : IAL

Reviewer : Chris Taylor

Date of Review: 8/15/2011

Check one: Lab ID 05788-	(X) X	Matrix	Date of Sample Collection	Cr +6 Analysis Date	Holding Time Exceeded	QA Decision
05788-001		A	06/14/11	06/15/11	0	ACCEPT
05788-002		A	06/14/11	06/15/11	0	ACCEPT
05788-003		A	06/14/11	06/15/11	0	ACCEPT
05788-004		A	06/14/11	06/15/11	0	ACCEPT
05788-005		A	06/14/11	06/15/11	0	ACCEPT
05788-006		A	06/14/11	06/15/11	0	ACCEPT
05788-007		A	06/14/11	06/15/11	0	ACCEPT

List below any samples that exceeded the holding time, and the QA action taken:

	Cooler Temp: 4° C
	Preservation:
	Handling Time:

Instrument Calibration Curve and Calibration Check Standard (CCS)
for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the instrument properly standardized ? X
 (I.e., Blank + 4 conc. Levels; $r^2 > 0.995$?)
 If No, explain and list action : _____

2. Was the CCS analyzed at the proper frequency ? X
 (Beginning of run, after each 10 samples, end of run.)
 If No, explain and list action : _____

3. Was the same CCS concentration used throughout the analysis ? X
 If No, list action : _____

4. Does the CCS standard meet the QC requirements of 90 - 110% recovery ? X
 If No, list % recovery, and action : _____

5. Show calculation for the % recovery of Hexavalent Chromium in the CCS standard.

Lab CCS value : 0.4936 mg/L Lab value : 99 % recovery

True CCS value : 0.500 mg/L

 Calculated value = 98.7
 (Lab / True x 100)

6. Specific comments :

Initial calibration was performed on 06/15/11 (H₂O).

Reported results were verified at random from the raw data; no disparities were noted.

Calibration Blanks for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Was the calibration blank analyzed before the calibration standards during the preparation of the calibration curve ?

If No, list action : _____

2. Was a calibration blank analyzed after each calibration check standard (CCS) ?

If No, list action : _____

3. Was the value for Hexavalent Chromium in the calibration blank below the MDL ?

If No, list action : _____

4. Specific comments : _____

Post - Verification Spike Analysis (PVS)
for Hexavalent Chromium

PVS analysis performed on sample(s) : 05788-001

Matrix : Water

Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the PVS analysis performed at the correct frequency and at the proper concentration ? (for H₂O, 30 ug/L or 2x sample, w/e is >) (for soil, 40 mg/Kg or 2x sample, w/e is >)

If No, note deviations and action : The native sample concentration was 'ND' (not detected), and spike added concentration 500 ug/L. This exceeds the specified concentration for spike addition. Associated samples are flagged as estimated (UJ or J), with indeterminate bias.

2. Was the PVS analysis performed on a field sample ?

If No, qualify all associated samples.

3. a. Did the PVS recovery for Cr +6 meet the criteria of 85 - 115% ?

If No, list action : _____

3. b. If the % recovery was less than 85% did the laboratory re-spike and re-analyze the aliquot ?

n/a

If No, list action : _____

Did the % recovery for the reanalysis meet the criteria of 85 - 115% ?

n/a

If No, list action : _____

5. Show calculation for PVS % recovery for Cr +6.

Sample ID: 05788-001
Lab spiked sample value : 496 ug/L
Lab un-spiked sample value : ND ug/L
Spike added concentration : 500 ug/L

Calculated value = 99.2 % recovery
(Spiked - Unspiked) / Spike Added x 100)

Lab value : 99.2 % recovery

Verified ? yes

6. Specific comments : _____

Duplicate Analysis for Hexavalent Chromium

Duplicate analysis performed on sample : 05788-001 S

Matrix : Water
Units : ug/L

Associated samples : All aqueous SDG samples

YES NO

1. Was the duplicate analysis performed at the correct frequency ? [X]

If No, note deviations and action :

2. Was the duplicate analysis performed on a field sample ? [X]

If No, qualify all associated samples.

3. Did the duplicate results for Cr +6 meet the QC control limits ? [X]
(20% RPD for all Aqueous samples & Non-aqueous > or = 8 ppm)
(+ / - 2 ppm for Non-aqueous samples if either or both are < 8.0 ppm)

If No, list action :

4. Show calculation for % RPD for Cr+6.

Sample ID: 05788-001 S
Lab sample value : 496 ug/L
Lab duplicate value : 494 ug/L
Calculated value = 0.40 % RPD
% RPD = (Sample - Duplicate) / ((Sample + Duplicate)/2) x 100

Sample ID:
Lab sample value : ug/L
Lab duplicate value : ug/L
Calculated value = #DIV/0! % RPD
% RPD = (Sample - Duplicate) / ((Sample + Duplicate)/2) x 100

5. Specific comments :

Sample Result Verification for Hexavalent Chromium

Associated samples : All SDG samples

YES NO

1. Were all samples reported within the calibration range? X

If No, list affected samples and action : _____

2. Was the raw data free of any anomalies ? X

If No, list affected samples and action : _____

3. Was the data package free of any computational or transcription errors ? X

If No, list affected samples and action : _____

4. Were 7196A pH readings provided for all samples, and within the method required range ? X

(Method 7196A : all analytical solutions must be adjusted to pH 1.6 - 2.2)

If No, list affected samples and action : _____

5. Verify that aqueous samples were correctly reported by recalculating the result for Hexavalent Chromium in a sample.

Sample result, wet : 0.5784 mg/L

Sample ID: **05788-003**

Lab value : **14.46** mg/L

Calculated value = **14.46** mg/L

	<i>curve mg/L</i>	<i>dilution</i>				
Sample Conc., mg/L =	0.57835	25	=	14.459		
				<i>mg/L</i>		

Result verified ? **Yes**