



Laboratory Data Consultants, Inc.

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Northgate Environmental Management, Inc.
1100 Quail Street Ste. 102
Newport Beach, CA 92660
ATTN: Ms. Cindy Arnold

January 14, 2011

SUBJECT: Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada,
Data Validation

Dear Ms. Arnold,

Enclosed is the final validation report for the fraction listed below. This SDG was received on October 4, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24140-2:

SDG #

Fraction

280-7342-1/ITI1357

Wet Chemistry

The data validation was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Standard Operating Procedures (SOP) 40, Data Review/Validation, BRC 2009
- Quality Assurance Project Plan Tronox LLC Facility, Henderson Nevada, June 2009
- NDEP Guidance, May 2006
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,


Erlinda T. Rauto

Operations Manager/Senior Chemist

EDD CHECKLIST

LDC #: 24140
 SDG #: 280-7342-1/ITI1357

Page: 1 of 1
 Reviewer: JE
 2nd Reviewer: BC

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?	X			
If yes, were they corrected or documented for the client?	X			See EDD_discrepancy_ form LDC24140_011411.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

LDC #24140 (Tronox LLC-Northgate, Henderson NV / Tronox PCS Additional Sampling)

EDD	Stage	SDG#	DATE REC'D	DATE DUE (3)	VOA (8260B)		SVOA (8270C)		Pest. (8081A)		As (6020)		Co (6020)		Pb (6020)		Mn (6020)		Mg (6020)		ClO ₄ (314.0)		Cr6+ (7199)																		
					W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S							
		Matrix: Water/Soil																																							
A		280-6956-1	10/04/10	11/11/10																																					
A		280-6956-1	10/04/10	11/11/10																																					
B		280-6983-1	10/04/10	11/11/10																																					
B		280-6983-1	10/04/10	11/11/10																																					
C		280-7103-1	10/04/10	11/11/10																																					
C		280-7103-1	10/04/10	11/11/10																																					
D		280-7117-1	10/04/10	11/11/10																																					
D		280-7117-1	10/04/10	11/11/10																																					
E		280-7183-1	10/04/10	11/11/10																																					
E		280-7183-1	10/04/10	11/11/10																																					
F		280-7229-1	10/04/10	11/11/10																																					
F		280-7229-1	10/04/10	11/11/10																																					
G		280-7342-1/11/1357	10/04/10	11/11/10																																					
G		280-7342-1/11/1357	10/04/10	11/11/10																																					
H		280-7344-1	10/04/10	11/11/10																																					
H		280-7344-1	10/04/10	11/11/10																																					
I		280-7047-1	10/04/10	11/11/10																																					
I		280-7047-1	10/04/10	11/11/10																																					
		T/RL			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Tronox LLC Facility, PCS Additional Sampling,
Henderson, Nevada

Collection Date: September 10, 2010

LDC Report Date: January 13, 2011

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7342-1/ITI1357

Sample Identification

SSA08-08-9.5BPC
SSA08-05-9.5BPC**
SSA08-05-9.5BPC_FD
SSA07-05-9.5BPC
SSA07-05-9.5BPCMS
SSA07-05-9.5BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil samples listed on the cover sheet. The analyses were per EPA SW 846 Method 7199 for Hexavalent Chromium.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Hexavalent chromium	0.1 ug/L	All samples in SDG 280-7342-1-1/IT1357

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable for samples on which a Stage 4 review was performed.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7342-1/IT11357	All analytes reported below the PQL.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SSAO8-05-9.5BPC** and SSAO8-05-9.5BPC_FD were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

**Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG 280-7342-1/ITI1357**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7342-1/ ITI1357	SSAO8-08-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO7-05-9.5BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

**Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-7342-1/ITI1357**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG 280-7342-1/ITI1357**

No Sample Data Qualified in this SDG

LDC #: 24140G6
 SDG #: 280-7342-1/IT11357
 Laboratory: Test America

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
 Stage 2B/4

Date: 1/13/11
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/10/10
IIa.	Initial calibration	D	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	(2,3)
X.	Field blanks	N	

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

1	SSAO8-08-9.5BPC	11	(RBS)	21		31
2	SSAO8-05-9.5BPC**	12		22		32
3	SSAO8-05-9.5BPC_FD	13		23		33
4	SSAO7-05-9.5BPC	14		24		34
5	SSAO7-05-9.5BPCMS	15		25		35
6	SSAO7-05-9.5BPCMSD	16		26		36
7		17		27		37
8		18		28		38
9		19		29		39
10		20		30		40

Notes: _____

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of \leq CRDL ($\leq 2X$ CRDL for soil) was used for samples that were $\leq 5X$ the CRDL, including when only one of the duplicate sample values were $< 5X$ the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 2414066

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.		/		
X. Field blanks				
Field blanks were identified in this SDG.			/	
Target analytes were detected in the field blanks.			/	

LDC #: 244066

**Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

Method: Inorganics, Method 796A

The correlation coefficient (r) for the calibration of C6+ was recalculated. Calibration date: 9/9/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found} \times 100}{\text{True}}$ Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated		Reported		Acceptable (Y/N)
					r	r ²	r	r ²	
Initial calibration	C6+	s1	0	0	0.999997	0.999997			Y
		s2	0.3	0.173					
		s3	1	0.51					
		s4	10	5.48					
		s5	25	13.92					
		s6	50	27.75					
		s7	75	41.54					
		s8	100	55.33					
Calibration verification		ICV	50	51.0		102	-		
Calibration verification		CCV	↓	51.9		101	101		
Calibration verification		↓	↓	52.1		101	104		Y

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method SEE COVER

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
 True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration
 D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units) <u>ng/Ls</u>	True / D (units) <u>ng/Ls</u>	Recalculated		Acceptable (Y/N)
					%R / RPD	Reported %R / RPD	
<u>LCS</u>	Laboratory control sample	<u>Cd+</u>	<u>15.7</u>	<u>16.0</u>	<u>98</u>	<u>98</u>	<u>Y</u>
<u>5</u>	Matrix spike sample	<u>↓</u>	<u>14.7</u> (SSR-SR)	<u>17.3</u>	<u>85</u>	<u>85</u>	<u>Y</u>
<u>5/6</u>	Duplicate sample	<u>↓</u>	<u>14.7</u>	<u>15.9</u>	<u>8</u>	<u>8</u>	<u>Y</u>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 2414066

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: LN

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- N N/A Have results been reported and calculated correctly?
- N N/A Are results within the calibrated range of the instruments?
- N N/A Are all detection limits below the CRQL?

Compound (analyte) results for _____ reported with a positive detect were recalculated and verified using the following equation:

Concentration = _____ Recalculation: _____

Non Detect

#	Sample ID	Analyte	Reported Concentration ()	Calculated Concentration ()	Acceptable (Y/N)

Note: _____
