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 24, 2011

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

Dear Ms. Arnold,

Enclosed is the revised data validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 24449:

SDG #	**Fraction**
280-6290-1/ITH1754	Wet Chemistry

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

Revision 1

LDC Report# 24449A6

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 9 through August 10, 2010

LDC Report Date: January 24, 2011

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

***Sample Delivery Group (SDG):** 280-6290-1/ITH1754

Sample Identification

SSAJ2-06-1BPC
SSAJ2-06-3BPC
SSAJ2-06-5BPC
SSAJ3-05-12BPC
SSAJ3-05-16BPC**
SSAJ3-05-1BPC
SSAJ3-05-5BPC
SSAJ3-05-8BPC
SSAJ3-07-12BPC
SSAJ3-07-17BPC
SSAJ3-07-1BPC
SSAJ3-07-5BPC
SSAJ3-07-8BPC
SB03-24BPC
EB-08092010
EB-08102010
SSAJ3-05-12BPCMS
SSAJ3-05-12BPCMSD
SSAJ3-05-12BPCDUP

**Indicates sample underwent Stage 4 review
*Added SDG # ITH1754 and Hexavalent Chromium

Introduction

This data review covers 17 soil samples and 2 water samples listed on the cover sheet. The analyses were per EPA SW 846 Method 9056A for Chlorate, EPA Method 314.0 for Perchlorate, and 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 chlorate or perchlorate was found in the initial, continuing and preparation blanks.

Samples EB-08092010 and EB-08102010 were identified as equipment blanks. No chlorate or perchlorate was found in these blanks.

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. Results were within QC limits.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) 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 280-6290-1/ITH1754	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG 280-6290-1/ITH1754

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6290-1/ITH1754	SSAJ2-06-1BPC SSAJ2-06-3BPC SSAJ2-06-5BPC SSAJ3-05-12BPC SSAJ3-05-16BPC** SSAJ3-05-1BPC SSAJ3-05-5BPC SSAJ3-05-8BPC SSAJ3-07-12BPC SSAJ3-07-17BPC SSAJ3-07-1BPC SSAJ3-07-5BPC SSAJ3-07-8BPC SB03-24BPC EB-08092010 EB-08102010	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 280-6290-1/ITH1754

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG 280-6290-1/ITH1754

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449A6
SDG #: 280-6290-1 / ITH1754
Laboratory: Test America

Date: 12-1-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: (Analyte) Chlorate (EPA SW846 Method 9056A), Perchlorate (EPA Method 314.0), Hexavalent Cr (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: 8/9-10/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	EB=15,16

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil/water

1	SSAJ2-06-1BPC S	11	SSAJ3-07-1BPC S	21		31	
2	SSAJ2-06-3BPC	12	SSAJ3-07-5BPC	22		32	
3	SSAJ2-06-5BPC	13	SSAJ3-07-8BPC	23		33	
4	SSAJ3-05-12BPC	14	SB03-24BPC	24		34	
5	SSAJ3-05-16BPC**	15	EB-08092010 W	25		35	
6	SSAJ3-05-1BPC	16	EB-08102010	26		36	
7	SSAJ3-05-5BPC	17	SSAJ3-05-12BPCMS S	27		37	
8	SSAJ3-05-8BPC	18	SSAJ3-05-12BPCMSD	28		38	
9	SSAJ3-07-12BPC	19	SSAJ3-05-12BPCDUP	29		39	
10	SSAJ3-07-17BPC	20		30		40	

Notes:

LDC #: 24449A6

VALIDATION FINDINGS CHECKLIST

Reviewer: CK
2nd Reviewer: W

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) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 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 #: 24449A6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: VC

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 #: 24449A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-13,15,16		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
14		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ClO_3 Cr^{6+}
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:17-19		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24449A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: OR
2nd Reviewer: [illegible]

Method: Inorganics, Method 3140

The correlation coefficient (r) for the calibration of ClO4 was recalculated. Calibration date: 8/10/10

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)	Reading	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1.000	0.00303	*0.999410*	0.999165	Y
		s2	2.5	0.00749			
		s3	5	0.02			
		s4	10	0.03			
		s5	20	0.07			
		s6	40	0.15			
Calibration verification	↓	ICV	20	Found(mg/l) 19.139	96	—	↓
Calibration verification	↓	CCV	30	27.866	93	—	↓
Calibration verification	↓						

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.

LDC #: 24469A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

$\%R = \frac{Found}{True} \times 100$ 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~~) mg/kg	True / D (~~units~~) mg/kg	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl04	0.0914	0.0971	94	94	Y
17	Matrix spike sample	↓	(SSR-SR) 0.095	0.106	90	93	↓
19	Duplicate sample	↓	0.15	0.165	11	12	↓

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 #: 24449A

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

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

Compound (analyte) results for ClO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$y = 0.0037x - 0.001$

$$\frac{(0.00312)(10)}{(0.899)(1000)} = 0.0125 \text{ mg/kg}$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	5	ClO_4	0.012	0.013	Y

Note: