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

December 14, 2010

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on November 23, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24449:

SDG #	Fraction
280-6290-1, 280-6385-1 280-6415-1, 280-7549-1	Volatiles, Semivolatiles, Chlorinated Pesticides, Metals, 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 Superfund Organic Methods Data Review, June 2008
- 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

DL 11/08/10 Delivery 18A Attachment 1

EDD Stage 2B/4

LDC #24449 (Tronox LLC-Northgate, Henderson NV / Tronox PCS Additional Sampling)

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260B)		SVOA (8270C)		Pest. (8081A)		Metals (SW846)		As (6020)		Mn (6020)		Chlorate (9045A)		CLO_4 (314.0)																	
Matrix:	Water/Soil			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
A	280-6290-1	11/23/10	12/16/10	-	-	2	19	1	10	2	1	0	31	-	-	0	1	2	13															
A	280-6290-1	11/23/10	12/16/10	-	-	0	2	0	1	0	0	0	3	-	-	0	0	0	1															
B	280-6385-1	11/23/10	12/16/10	-	-	-	-	1	19	-	-	1	19	1	19	-	-	1	0															
B	280-6385-1	11/23/10	12/16/10	-	-	-	-	0	3	-	-	0	3	0	3	-	-	0	0															
C	280-6415-1	11/23/10	12/16/10	-	-	-	-	2	22	-	-	2	22	2	22	-	-	-	-															
C	280-6415-1	11/23/10	12/16/10	-	-	-	-	0	2	-	-	0	2	0	2	-	-	-	-															
D	280-7549-1	11/23/10	12/16/10	1	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
D	280-7549-1	11/23/10	12/16/10	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Total	T/LR			1	15	2	21	4	57	2	1	3	80	3	46	0	1	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	253

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS/MSD, and DUPs

LDC #: 24449
SDG #: 280-6290-1, 280-6385-1, 280-6415-1, 280-7549-1

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_LDC24449_111310.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 17, 2010
LDC Report Date:	December 8, 2010
Matrix:	Soil/Water
Parameters:	Volatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7549-1

Sample Identification

TB-09172010_1
SSAO7-05-9.5BPC
SSAO8-05-9.5BPC**
SSAO8-05-9.5BPC_FD
SSAO8-08-9.5BPC
SSAO7-08-0.5BPC
SSAO7-08-0BPC
SSAO7-07-0BPC
SSAO7-07-0.5BPC
SSAO8-06-0BPC
SSAO8-06-0.5BPC
SSAO8-09-0BPC
SSAO8-09-0.5BPC
SSAO8-12-0BPC**
SSAO8-12-0.5BPC
SSAO8-12-0BPC_FD
SSAO7-05-9.5BPCMS
SSAO7-05-9.5BPCMSD
SSAO7-07-0BPCMS
SSAO7-07-0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 19 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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 Superfund Organic Methods Data Review (June 2008).

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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All samples in SDG 280-7549-1	All TCL compounds	Freezer storing samples went out of temperature control limits for 11 hours.	Cooler temperature must be 4±2°C .	J- (all detects) UJ (all non-detects)	A

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/27/10	tert-Butyl alcohol	0.0042 (≥0.05)	TB-09172010_1 MB280-33890/6	J (all detects) UJ (all non-detects)	A

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
8/31/10	tert-Butyl alcohol	0.0243 (≥0.05)	SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0.5BPC SSAO8-12-0BPC_FD SSAO7-05-9.5BPCMS SSAO7-05-9.5BPCMSD SSAO7-07-0BPCMS SSAO7-07-0BPCMSD MB280-32921/3-A 9/24 MB280-32921/3-A 9/25 MB280-33216/1-A	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs) and 25.0% for all other compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/24/10	tert-Butyl alcohol	0.0192 (≥0.05)	SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO7-05-9.5BPCMS SSAO7-05-9.5BPCMSD SSAO7-07-0BPCMS SSAO7-07-0BPCMSD MB280-32921/3-A 9/24	J (all detects) UJ (all non-detects)	A

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/25/10	tert-Butyl alcohol	0.0253 (≥0.05)	SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-12-0.5BPC MB280-32921/3-A 9/25	J (all detects) UJ (all non-detects)	A
9/27/10	tert-Butyl alcohol	0.0226 (≥0.05)	SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0BPC_FD MB280-33216/1-A	J (all detects) UJ (all non-detects)	A
9/30/10	tert-Butyl alcohol	0.0034 (≥0.05)	TB-09172010_1 MB280-33890/6	J (all detects) UJ (all non-detects)	A

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-32921/3-A 9/24	9/24/10	Methylene chloride	1.98 ug/Kg	SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC
MB280-32921/3-A 9/25	9/25/10	Methylene chloride	1.53 ug/Kg	SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-12-0.5BPC
MB280-33216/1-A	9/27/10	Hexachlorobutadiene Methylene chloride Naphthalene	0.883 ug/Kg 1.47 ug/Kg 0.696 ug/Kg	SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0BPC_FD
MB280-33890/6	9/30/10	Methylene chloride	0.399 ug/L	TB-09172010_1

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAO7-05-9.5BPC	Methylene chloride	2.0 ug/Kg	2.0U ug/Kg
SSAO8-05-9.5BPC**	Methylene chloride	0.99 ug/Kg	0.99U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAO8-05-9.5BPC_FD	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAO8-08-9.5BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO7-08-0.5BPC	Methylene chloride	0.69 ug/Kg	0.69U ug/Kg
SSAO7-08-0BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO7-07-0BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAO7-07-0.5BPC	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAO8-06-0BPC	Methylene chloride	1.9 ug/Kg	1.9U ug/Kg
SSAO8-06-0.5BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO8-12-0.5BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAO8-09-0BPC	Methylene chloride Naphthalene	1.8 ug/Kg 1.2 ug/Kg	1.8U ug/Kg 1.2U ug/Kg
SSAO8-09-0.5BPC	Methylene chloride Naphthalene	1.2 ug/Kg 0.60 ug/Kg	1.2U ug/Kg 0.60U ug/Kg
SSAO8-12-0BPC**	Methylene chloride	1.2 ug/Kg	1.2U ug/Kg
SSAO8-12-0BPC_FD	Methylene chloride	0.78 ug/Kg	0.78U ug/Kg
TB-09172010_1	Methylene chloride	0.79 ug/L	0.79U ug/L

Sample TB-09172010_1 was identified as a trip blank. No volatile contaminants were found in this blank with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB-09172010_1	9/17/10	Acetone Methylene chloride	2.5 ug/L 0.79 ug/L	All soil samples in SDG 280-7549-1

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SSAO8-05-9.5BPC**	Methylene chloride	0.99 ug/Kg	0.99U ug/Kg
SSAO8-05-9.5BPC_FD	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAO8-08-9.5BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO7-08-0.5BPC	Acetone Methylene chloride	4.7 ug/Kg 0.69 ug/Kg	4.7U ug/Kg 0.69U ug/Kg
SSAO7-08-0BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO7-07-0BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAO7-07-0.5BPC	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAO8-06-0.5BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAO8-09-0.5BPC	Methylene chloride	1.2 ug/Kg	1.2U ug/Kg
SSAO8-12-0BPC**	Acetone Methylene chloride	5.0 ug/Kg 1.2 ug/Kg	5.0U ug/Kg 1.2U ug/Kg
SSAO8-12-0.5BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAO8-12-0BPC_FD	Methylene chloride	0.78 ug/Kg	0.78U ug/Kg

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD relative percent differences (RPD) were not within QC limits for several compounds, the MS/MSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recovery (%R) was not within QC limits for one compound, the LCSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria for samples on which a Stage 4 review was performed.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7549-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SSAO8-05-9.5BPC** and SSAO8-05-9.5BPC_FD and samples SSAO8-12-0BPC** and SSAO8-12-0BPC_FD were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAO8-05-9.5BPC**	SSAO8-05-9.5BPC_FD				
Chloroform	0.44	0.34	-	0.10 (≤6.4)	-	-
Methylene chloride	0.99	1.0	-	0.01 (≤3.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAO8-12-0BPC**	SSAO8-12-0BPC_FD				
1,1-Dichloroethene	0.55	2.8U	-	2.25 (≤2.8)	-	-
2-Butanone	13U	3.2	-	9.80 (≤13)	-	-
Acetone	5.0	16	-	11.00 (≤13)	-	-
Methylene chloride	1.2	0.78	-	0.42 (≤3.1)	-	-
Naphthalene	7.5	3.9	-	3.60 (≤3.1)	J (all detects)	A

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG 280-7549-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7549-1	TB-09172010_1 SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0.5BPC SSAO8-12-0BPC_FD	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Cooler temperature (o)
280-7549-1	TB-09172010_1 SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0.5BPC SSAO8-12-0BPC_FD	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
280-7549-1	SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-12-0.5BPC SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0BPC_FD TB-09172010_1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7549-1	TB-09172010_1 SSAO7-05-9.5BPC SSAO8-05-9.5BPC** SSAO8-05-9.5BPC_FD SSAO8-08-9.5BPC SSAO7-08-0.5BPC SSAO7-08-0BPC SSAO7-07-0BPC SSAO7-07-0.5BPC SSAO8-06-0BPC SSAO8-06-0.5BPC SSAO8-09-0BPC SSAO8-09-0.5BPC SSAO8-12-0BPC** SSAO8-12-0.5BPC SSAO8-12-0BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
280-7549-1	SSAO8-12-0BPC** SSAO8-12-0BPC_FD	Naphthalene	J (all detects)	A	Field duplicates (Differences) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-7549-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7549-1	SSAO7-05-9.5BPC	Methylene chloride	2.0U ug/Kg	A	bl
280-7549-1	SSAO8-05-9.5BPC**	Methylene chloride	0.99U ug/Kg	A	bl
280-7549-1	SSAO8-05-9.5BPC_FD	Methylene chloride	1.0U ug/Kg	A	bl
280-7549-1	SSAO8-08-9.5BPC	Methylene chloride	1.1U ug/Kg	A	bl
280-7549-1	SSAO7-08-0.5BPC	Methylene chloride	0.69U ug/Kg	A	bl
280-7549-1	SSAO7-08-0BPC	Methylene chloride	1.1U ug/Kg	A	bl
280-7549-1	SSAO7-07-0BPC	Methylene chloride	1.3U ug/Kg	A	bl
280-7549-1	SSAO7-07-0.5BPC	Methylene chloride	1.0U ug/Kg	A	bl
280-7549-1	SSAO8-06-0BPC	Methylene chloride	1.9U ug/Kg	A	bl
280-7549-1	SSAO8-06-0.5BPC	Methylene chloride	1.1U ug/Kg	A	bl
280-7549-1	SSAO8-12-0.5BPC	Methylene chloride	1.3U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7549-1	SSAO8-09-0BPC	Methylene chloride Naphthalene	1.8U ug/Kg 1.2U ug/Kg	A	bl
280-7549-1	SSAO8-09-0.5BPC	Methylene chloride Naphthalene	1.2U ug/Kg 0.60U ug/Kg	A	bl
280-7549-1	SSAO8-12-0BPC**	Methylene chloride	1.2U ug/Kg	A	bl
280-7549-1	SSAO8-12-0BPC_FD	Methylene chloride	0.78U ug/Kg	A	bl
280-7549-1	TB-09172010_1	Methylene chloride	0.79U ug/L	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG 280-7549-1

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
280-7549-1	SSAO8-05-9.5BPC**	Methylene chloride	0.99U ug/Kg	A	bt
280-7549-1	SSAO8-05-9.5BPC_FD	Methylene chloride	1.0U ug/Kg	A	bt
280-7549-1	SSAO8-08-9.5BPC	Methylene chloride	1.1U ug/Kg	A	bt
280-7549-1	SSAO7-08-0.5BPC	Acetone Methylene chloride	4.7U ug/Kg 0.69U ug/Kg	A	bt
280-7549-1	SSAO7-08-0BPC	Methylene chloride	1.1U ug/Kg	A	bt
280-7549-1	SSAO7-07-0BPC	Methylene chloride	1.3U ug/Kg	A	bt
280-7549-1	SSAO7-07-0.5BPC	Methylene chloride	1.0U ug/Kg	A	bt
280-7549-1	SSAO8-06-0.5BPC	Methylene chloride	1.1U ug/Kg	A	bt
280-7549-1	SSAO8-09-0.5BPC	Methylene chloride	1.2U ug/Kg	A	bt
280-7549-1	SSAO8-12-0BPC**	Acetone Methylene chloride	5.0U ug/Kg 1.2U ug/Kg	A	bt
280-7549-1	SSAO8-12-0.5BPC	Methylene chloride	1.3U ug/Kg	A	bt
280-7549-1	SSAO8-12-0BPC_FD	Methylene chloride	0.78U ug/Kg	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449D1
SDG #: 280-7549-1
Laboratory: Test America

Date: 12/06/10
Page: 1 of 1
Reviewer: SW
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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	SW	Sampling dates: 9/17/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD
IV.	Continuing calibration/ICV	SW	CW/ICW ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 3,4 D_2 = 14, 16
XVII.	Field blanks	SW	TB = 1

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

Water + Soil

1	5	TB-09172010_1	W	11	2/4	SSAO8-06-0.5BPC	S	21	+	MB 280-32921/3-A	9/24 30:34
2	1	SSAO7-05-9.5BPC	S	12	3	SSAO8-09-0BPC		22	+	280-32921/3-A	9/24 31:30
3	1	SSAO8-05-9.5BPC**	D1	13	3	SSAO8-09-0.5BPC		23	+	280-33216/1-A	35
4	1	SSAO8-05-9.5BPC_FD	D1	14	3	SSAO8-12-0BPC**	D2	24	−	280-33371/1-A	34 (kkk, mmm)
5	1	SSAO8-08-9.5BPC		15	2/4	SSAO8-12-0.5BPC		25	+	280-33890/6	35
6	1	SSAO7-08-0.5BPC		16	3	SSAO8-12-0BPC_FD	D2	26			36
7	1	SSAO7-08-0BPC		17	1	SSAO7-05-9.5BPCMS		27			37
8	1	SSAO7-07-0BPC		18	1	SSAO7-05-9.5BPCMSD		28			38
9	1	SSAO7-07-0.5BPC		19	1	SSAO7-07-0BPCMS		29			39
10	2	SSAO8-06-0BPC	✓	20	1	SSAO7-07-0BPCMSD	✓	30			40

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓	✓		
II. GC/MS instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?		✓		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) > 0.05?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 24449 D1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		✓		
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 24449D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: [illegible]
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y (N) N/A Were all cooler temperatures within validation criteria?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
All	Freezers storing samples went out of temperature control limits for 11 hours						J-/UJ/A (o)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Both within 14 days of sample collection.
Soil:	Both within 14 days of sample collection.

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: DVG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
(Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? r ≥ 0.99
(Y) N N/A Did the initial calibration meet the acceptance criteria?
(Y) N N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/27/10	ICAL-MS1	ZZZ		0.0047	All W + MB 280-33396/6	J /NJ / A (C)
	8/31/10	ICAL-MS J	ZZZ		0.0243	All S + MB 280-32921/3-A 9/24, MB 280-32921/3-A 9/25, MB 280-33216/1-A	

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/24/10	J1225	ZZZ		0.0197	2-9, 17-20, MB 280-32921/3-A 9/24	J/UJ/A (CCV)
	9/25/10	J1258	ZZZ		0.0253	10, 11, 15, MB 280-32921/2-A 9/25	
	9/27/10	J1289	ZZZ		0.0226	12-14, 16, MB 280-33216/1-A	
	9/20/10	MS4125	ZZZ		0.0034	1 + MB 280-33290/6	✓

CONCAL.wpd

LDC #: 24449D1

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: OV6
2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y/N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 9/24/10 10:31 (bl)
Conc. units: ug/Kg Associated Samples: 2 – 9

Compound	Blank ID	Sample Identification								
2K	MB	280-32921/3-A	2	3	4	5	6	7	8	9
3.96 Methylene chloride E	1.98	2.0 U	0.99 U	1.0 U	1.1 U	0.69 U	1.1 U	1.3 U	1.0 U	
Acetone										
CRQL										

Blank analysis date: 9/25/10 11:20 (bl)
Conc. units: ug/Kg Associated Samples: 10, 11, 15

Compound	Blank ID	Sample Identification								
2K	MB	280-32921/3-A	10	11	15					
3.66 Methylene chloride E	1.53	1.9 U	1.1 U	1.3 U						
Acetone										
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 2 of 2
Reviewer: JW
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 9/27/10 (bl)
Conc. units: ug/kg Associated Samples: 12-14, 16

Compound		Blank ID	Sample Identification								
	N/B	280-33216/1-A	12	13	14	16					
2X .766 Methylene chloride	LLL	0.883									
2.94 Acetone	E	1.47	1.8/U	1.2/U	1.2/U	0.78/U					
1.392	MMM	0.696	1.2/U	0.60/U	(7.5)	(3.9)					
CRQL											

Blank analysis date: 9/30/10 (bl)
Conc. units: ug/L Associated Samples: 1

Compound		Blank ID	Sample Identification								
	N/B	280-33890/6		1							
Methylene chloride	E	0.399		0.79/U							
Acetone											
CRQL											

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: NV
2nd Reviewer: 2

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

(Y) N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 9/17/10
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: All S (bt)

Compound	Blank ID	Sample Identification									
	1	2	3	4	5	6	7	8	9	10
2X 5.0 ~~Methylene chloride~~ F	2.5					4.7/4	(71)	(96)	(42)	(75)
.58 ~~Acetone~~ E	0.79	(2.0)	0.99/4	1.0/4	1.1/4	0.69/4	1.1/4	1.3/4	1.0/4	(1.9)
Chloroform										

Blank units: **Associated sample units:**
Sampling date:
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: same as above (bt)

Compound	Blank ID	Sample Identification									
	1	11	12	13	14	15	16				
~~Methylene chloride~~ F	2.5	(34)	(210)	(72)	5.0/4	(23)	(16)				
~~Acetone~~ E	0.79	1.1/4	(1.8)	1.2/4	1.2/4	1.3/4	0.78/4				
Chloroform											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 29449D1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MG
2nd Reviewer: R

METHOD : GC/MS VOA (EPA SW 846 Method 8260)

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

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
*	17/18	RPD	for all compounds ( )	outside limits ( )	( )	7	No qual (MS/MSD %R)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	19/20	RPD for several compounds ( )		outside limits ( )		8	
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

* 2 D but spiked amounts > 10 2

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Was a LCS required?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

9/24

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 280-32921/1,2-A	VV	121 (71-120)	( )	( )	1-9, MB 280-32921/3-A	No qual (LCSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#:24449D1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC MS Volatiles (EPA SW 846 Method 8260B)

(Y/N NA) Were field duplicate pairs identified in this SDG?
(Y/N NA) Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/Kg) 3	Concentration (ug/Kg) 4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Chloroform	0.44	0.34		0.10	(≤6.4)	
Methylene chloride	0.99	1.0		0.01	(≤3.2)	

Compound	Concentration (ug/Kg) 3 14	Concentration (ug/Kg) 4 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
1,1-Dichloroethene	0.55	2.8U		2.25	(≤2.8)	
2-Butanone	13U	3.2		9.80	(≤13)	
Acetone	5.0	16		11.00	(≤13)	
Methylene chloride	1.2	0.78		0.42	(≤3.1)	
Naphthalene	7.5	3.9		3.60	(≤3.1)	Jdets/A (fd)

LDC #: 28449 b1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound
S= Standard deviation of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 50 std)	Recalculated RRF (RRF 50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/31/2010	Acetone (IS1)	0.0551	0.0551	0.0538	0.0538	6.9	6.84
2	GC MSV J		Chlorobenzene (IS2)	2.8714	2.8714	2.8329	2.8329	4.0	4.00
3			1,1,2,2-TCA (IS3)	1.0214	1.0214	1.0017	1.0017	3.3	3.34
4									
5									
6									

Conc IS/Cpd	Area cpd	Area IS
50/200	553331	2512331
50/50	1798867	626482
50/50	1086352	1063598

Conc	Acetone	Chlorobenzene	1,1,2,2-TCA
2		3.0150	1.0270
50	0.0600	2.8949	1.0063
10	0.0539	2.7978	0.9683
20	0.0492	2.8109	0.9462
50	0.0551	2.8714	1.0214
100	0.0533	2.7961	1.0029
200	0.0513	2.6444	1.0401
X =	0.0538	2.8329	1.0017
S =	0.0037	0.1133	0.0335

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

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound
S= Standard deviation of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/29/2010	NR (IS1)						
2	GC MSV P		NR (IS2)						
3			Naphthalene (IS3)	1.2733	1.2733	1.3000	1.3000	7.1	7.10
4									
5									
6									

Conc IS/Cpd	Area cpd	Area IS
12.5/10		
12.5/10		
12.5/10	384026	376987

Conc	Acetone	Chlorobenzene	Naphthalene
1			1.3763
2			1.1461
5			1.2594
10			1.2733
30			1.3633
60			1.3817
X =	#DIV/0!	#DIV/0!	1.3000
S =	#DIV/0!	#DIV/0!	0.0922

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

LDC # 04449 D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound	(IS)	Average RRF (Initial)	Reported RRF (CCV)	Recalculated RRF (CCV)	Reported % D	Recalculated %D
1	J1225	9/24/2010	Acetone	(IS1)	0.054	0.046	0.046	13.9	13.9
	GC MSV J		Chlorobenzene	(IS2)	2.833	2.689	2.689	5.1	5.1
			1,1,2,2-TCA	(IS3)	1.002	0.928	0.928	7.3	7.3
2	J1258	9/25/2010	Acetone	(IS1)	0.054	0.050	0.050	7.2	7.2
	GC MSV J		Chlorobenzene	(IS2)	2.833	2.970	2.970	4.9	4.9
			1,1,2,2-TCA	(IS3)	1.002	1.050	1.050	4.9	4.9
3	P1404	9/29/2010	Naphthalene	(IS3)	1.3000	1.2727	1.2727	2.1	2.1
	MS P								

		CCV1		CCV2		CCV3	
Compound	Cis/Cx	Ax	Ais	Ax	Ais	Ax	Ais
Acetone	50/200	452929	2445776	467969	2342985	425368	417786
Chlorobenzene	50/50	1674423	622768	1758812	592094		
1,1,2,2-TCA	50/50	953941	1027682	1069360	1018037		

LDC #: 24449 D1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	52.2	104	104	0
Bromofluorobenzene		46.6	93	93	
1,2-Dichloroethane-d4		48.6	97	97	
Dibromofluoromethane		55.2	110	110	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

LDC #: 34449 D1
SDG #: Sa Cmpy

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JV6
2nd Reviewer: e

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = | MSC - MSC | * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD sample: 17 /18

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	52.7	36.5	0	48.8	31.9	93	93	87	87	42	6
Trichloroethene				47.1	29.8	89	89	82	82	45	8
Benzene				49.4	31.7	94	94	87	87	44	8
Toluene				48.7	30.7	92	92	84	84	45	9
Chlorobenzene				51.3	33.2	97	97	88	88	46	10

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. * Based on %R

LDC #: 24449D1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: LCSb280-32931/1,2-A (9/24)

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	50.0	50.0	58.1	58.1	116	116	116	116	0	0
Trichloroethene	↓	↓	53.5	54.2	107	107	108	108	1	1
Benzene			53.3	54.1	107	107	108	108	✓	✓
Toluene			52.7	53.7	105	105	107	107	✓	✓
Chlorobenzene			53.6	54.4	107	107	109	109	1	1

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

LDC #: 24499 D7

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. I 14 F

Conc. = $\frac{(20560)(50)(5\ ml)}{(241490)(0.054)(8.173\ g)(0.984)}$

= 4.94

≈ 5.0 ng/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 9, 2010
LDC Report Date:	December 8, 2010
Matrix:	Soil/Water
Parameters:	Semivolatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6290-1

Sample Identification

SSAQ3-03-10BPC	SB03-24BPC
SSAQ3-03-1BPC	EB-08092010
SSAQ3-03-5BPC	EB-08102010
SSAQ4-08-10BPC**	SSAJ3-05-12BPCMS
SSAQ4-08-10BPC_FD	SSAJ3-05-12BPCMSD
SSAQ4-08-1BPC	
SSAQ4-08-5BPC	
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	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 23 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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 Superfund Organic Methods Data Review (June 2008).

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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs) and 25.0% for all other compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280 -27100/1-A	8/16/10	Dimethylphthalate	44.9 ug/Kg	SSAQ3-03-10BPC SSAQ3-03-1BPC SSAQ3-03-5BPC SSAQ4-08-10BPC** SSAQ4-08-10BPC_FD SSAQ4-08-1BPC SSAQ4-08-5BPC 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 SSAJ3-05-12BPCMS SSAJ3-05-12BPCMSD

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAQ3-03-10BPC	Dimethylphthalate	88 ug/Kg	88U ug/Kg
SSAQ4-08-10BPC**	Dimethylphthalate	56 ug/Kg	56U ug/Kg
SSAQ4-08-10BPC_FD	Dimethylphthalate	36 ug/Kg	36U ug/Kg
SSAQ4-08-1BPC	Dimethylphthalate	50 ug/Kg	50U ug/Kg
SSAQ4-08-5BPC	Dimethylphthalate	47 ug/Kg	47U ug/Kg
SSAJ2-06-1BPC	Dimethylphthalate	30 ug/Kg	30U ug/Kg
SSAJ2-06-3BPC	Dimethylphthalate	33 ug/Kg	33U ug/Kg
SSAJ2-06-5BPC	Dimethylphthalate	45 ug/Kg	45U ug/Kg
SSAJ3-05-12BPC	Dimethylphthalate	43 ug/Kg	43U ug/Kg
SSAJ3-05-16BPC**	Dimethylphthalate	81 ug/Kg	81U ug/Kg
SSAJ3-05-1BPC	Dimethylphthalate	64 ug/Kg	64U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAJ3-05-5BPC	Dimethylphthalate	64 ug/Kg	64U ug/Kg
SSAJ3-07-12BPC	Dimethylphthalate	81 ug/Kg	81U ug/Kg
SSAJ3-07-17BPC	Dimethylphthalate	81 ug/Kg	81U ug/Kg
SSAJ3-07-1BPC	Dimethylphthalate	67 ug/Kg	67U ug/Kg
SSAJ3-07-5BPC	Dimethylphthalate	70 ug/Kg	70U ug/Kg
SSAJ3-07-8BPC	Dimethylphthalate	63 ug/Kg	63U ug/Kg

Samples EB-08092010 and EB-08102010 were identified as equipment blanks. No semivolatile contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. 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.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria for samples on which a Stage 4 review was performed with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAQ3-03-5BPC SSAQ4-08-1BPC SSAQ4-08-5BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	Due to lack of resolution between these compounds in the samples, the laboratory performed the quantitation using the total peak area.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

The reported results for the compounds listed above are biased high. The actual values of these compounds are lower than the values reported by the laboratory.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6290-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAQ4-08-10BPC** and SSAQ4-08-10BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAQ4-08-10BPC**	SSAQ4-08-10BPC_FD				
Dimethylphthalate	56	36	-	20 (≤350)	-	-
Hexachlorobenzene	450	470	-	20 (≤350)	-	-
Octachlorostyrene	140	160	-	20 (≤350)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6290-1	SSAQ3-03-5BPC SSAQ4-08-1BPC SSAQ4-08-5BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Project Quantitation Limit (q)
280-6290-1	SSAQ3-03-10BPC SSAQ3-03-1BPC SSAQ3-03-5BPC SSAQ4-08-10BPC** SSAQ4-08-10BPC_FD SSAQ4-08-1BPC SSAQ4-08-5BPC 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 compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6290-1	SSAQ3-03-10BPC	Dimethylphthalate	88U ug/Kg	A	bl
280-6290-1	SSAQ4-08-10BPC**	Dimethylphthalate	56U ug/Kg	A	bl
280-6290-1	SSAQ4-08-10BPC_FD	Dimethylphthalate	36U ug/Kg	A	bl
280-6290-1	SSAQ4-08-1BPC	Dimethylphthalate	50U ug/Kg	A	bl
280-6290-1	SSAQ4-08-5BPC	Dimethylphthalate	47U ug/Kg	A	bl
280-6290-1	SSAJ2-06-1BPC	Dimethylphthalate	30U ug/Kg	A	bl
280-6290-1	SSAJ2-06-3BPC	Dimethylphthalate	33U ug/Kg	A	bl
280-6290-1	SSAJ2-06-5BPC	Dimethylphthalate	45U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6290-1	SSAJ3-05-12BPC	Dimethylphthalate	43U ug/Kg	A	bl
280-6290-1	SSAJ3-05-16BPC**	Dimethylphthalate	81U ug/Kg	A	bl
280-6290-1	SSAJ3-05-1BPC	Dimethylphthalate	64U ug/Kg	A	bl
280-6290-1	SSAJ3-05-5BPC	Dimethylphthalate	64U ug/Kg	A	bl
280-6290-1	SSAJ3-07-12BPC	Dimethylphthalate	81U ug/Kg	A	bl
280-6290-1	SSAJ3-07-17BPC	Dimethylphthalate	81U ug/Kg	A	bl
280-6290-1	SSAJ3-07-1BPC	Dimethylphthalate	67U ug/Kg	A	bl
280-6290-1	SSAJ3-07-5BPC	Dimethylphthalate	70U ug/Kg	A	bl
280-6290-1	SSAJ3-07-8BPC	Dimethylphthalate	63U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449A2a
SDG #: 280-6290-1
Laboratory: Test America

Date: 12/06/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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: 8/09/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	6% RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	~~SW~~ A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	ND	~~SB = 21~~ EB = 22, 23

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	SSAQ3-03-10BPC	S	11	SSAJ3-05-12BPC	S	21	SB03-24BPC	S	31	MB 280-27100/1-A
2	SSAQ3-03-1BPC		12	SSAJ3-05-16BPC**		22	EB-08092010	W	32	MB 280-27168/1-A (SS only)
3	SSAQ3-03-5BPC		13	SSAJ3-05-1BPC		23	EB-08102010		33	MB 280-26860/1-A
4	SSAQ4-08-10BPC**	D	14	SSAJ3-05-5BPC		24	SSAJ3-05-12BPCMS	S	34	
5	SSAQ4-08-10BPC_FD	D	15	SSAJ3-05-8BPC		25	SSAJ3-05-12BPCMSD		35	
6	SSAQ4-08-1BPC		16	SSAJ3-07-12BPC		26			36	
7	SSAQ4-08-5BPC		17	SSAJ3-07-17BPC		27			37	
8	SSAJ2-06-1BPC		18	SSAJ3-07-1BPC		28			38	
9	SSAJ2-06-3BPC		19	SSAJ3-07-5BPC		29			39	
10	SSAJ2-06-5BPC		20	SSAJ3-07-8BPC		30			40	

(21- HCB only)

LDC #: 24449 A2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer:

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 24449 A2a

VALIDATION FINDINGS CHECKLIST

Reviewer: VC
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes:* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 24449 A2g
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y/N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 8/16/10 **Blank analysis date:** 8/23/10 (bl)
Conc. units: ug/kg Associated Samples: All S except 21

Compound	Blank ID	Sample Identification								
MB	280-27100/1-A	1	4	5	6	7	8	9	10	11
CC	44.9	88/U	56/U	36/U	50/U	47/U	30/U	33/U	45/U	43/U

5X 24.5

Blank extraction date: _____ **Blank analysis date:** _____ same as above (bl)
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
MB	280-27100/1-A	12	13	14	16	17	18	19	20	
CC	44.9	81/U	64/U	64/U	81/U	81/U	67/U	70/U	63/U	

5x Phthalates
2x all others

LDC #: 24449A2A

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: e

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		3, 6, 7	GGG, HHH peaks unresolved, lab need total peak area for quantitation		J/UJ/p (q)

Comments: See sample calculation verification worksheet for recalculations

LDC#:24449A2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC MS Semivolatiles (EPA SW 846 Method 8270C)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/Kg) 4	Concentration (ug/Kg) 5	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Dimethyl phthalate	56	36		20	(≤350)	
Hexachlorobenzene	450	470		20	(≤350)	
Octachlorostyrene	140	160		20	(≤350)	

V:\FIELD DUPLICATES\24449A2a.wpd

LDC #: 24449A2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS SVOA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound,
S= Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/21/2010	1,4-Dioxane (IS1)	0.5607	0.5607	0.5706	0.5707	4.1	4.13
	MSS K		Naphthalene (IS2)	1.0611	1.0611	1.0093	1.0093	5.7	5.70
			Fluorene (IS3)	1.3101	1.3101	1.2473	1.2473	5.3	5.25
			Hexachlorobenzene (IS4)	0.2418	0.2418	0.2300	0.2300	3.8	3.81
			Chrysene (IS5)	1.1089	1.1089	1.0581	1.0581	6.7	6.75
			Benzo(a)pyrene (IS6)	1.1425	1.1425	1.0793	1.0794	8.5	8.53

)nc IS/Cpd	Area cpd	Area IS
40/50	112429	160417
40/50	817090	616036
40/50	587234	358588
40/50	161541	534527
40/50	784054	565669
40/50	774079	542046

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachloro	Chrysene	Benzo(a)py
4.00	0.6209	1.0632	1.2493		1.1443	0.8934
10.00	0.5673	1.0390	1.2573	0.2339	1.1045	0.9948
20.00	0.5842	1.0490	1.3209	0.2330	1.1007	1.0754
50.00	**0.5607**	**1.0611**	**1.3101**	**0.2418**	**1.1089**	**1.1425**
80.00	0.5523	1.0236	1.2953	0.2310	1.0810	1.1683
120.00	0.5455	0.9799	1.2298	0.2266	0.9887	1.1297
160.00	0.5731	0.9540	1.1898	0.2305	0.9795	1.1318
200.00	0.5612	0.9045	1.1261	0.2131	0.9573	1.0989
X =	0.5707	1.0093	1.2473	0.2300	1.0581	1.0794
S =	0.0236	0.0575	0.0655	0.0088	0.0714	0.0920

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

LDC # 24449 A2a

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS SVOA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Ais = Area of associated internal standard
Cx = Concentration of compound
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)		Average RRF (Initial RRF)	Reported (CC RRF)	Recalculated (CC RRF)	Reported %D	Recalculated %D
1	K5828	08/23/10	1,4-Dioxane	(IS1)	0.5706	0.5422	0.5422	5.0	5.0
			Naphthalene	(IS2)	1.0093	1.1210	1.1210	11.1	11.1
			Fluorene	(IS3)	1.2473	1.4290	1.4290	14.6	14.6
			Hexachlorobenzene	(IS4)	0.2300	0.2640	0.2640	14.8	14.8
			Chrysene	(IS5)	1.0581	1.0684	1.0684	1.0	1.0
			Benzo(a)pyrene	(IS6)	1.0793	1.2357	1.2357	14.5	14.5
2	K5872	08/24/10	1,4-Dioxane	(IS1)	0.5706	0.5200	0.5200	8.9	8.9
			Naphthalene	(IS2)	1.0093	1.1283	1.1283	11.8	11.8
			Fluorene	(IS3)	1.2473	1.4081	1.4081	12.9	12.9
			Hexachlorobenzene	(IS4)	0.2300	0.2632	0.2632	14.5	14.5
			Chrysene	(IS5)	1.0581	1.0891	1.0891	2.9	2.9
			Benzo(a)pyrene	(IS6)	1.0793	1.2311	1.2311	14.1	14.1

			CCV1		CCV2	
Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	206796	190700	195412	187881
Naphthalene	(IS2)	40/80	1621366	723208	1580575	700454
Fluorene	(IS3)	40/80	1195169	418177	1158634	411418
Hexachlorobenzene	(IS4)	40/80	372526	705597	353417	671295
Chrysene	(IS5)	40/80	1824855	854050	1707482	783883
Benzo(a)pyrene	(IS6)	40/80	1845845	746891	1671727	678968

LDC #: 24949A2a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: g

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	57.6	58	58	0
2-Fluorobiphenyl	↓	71.4	71	71	↓
Terphenyl-d14	↓	94.0	94	94	↓
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 21449 A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JM
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 24 /25

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2680	2690	0	2170	2050	81	81	76	76	6	6
Pentachlorophenol			↓								
Pyrene	2680	2690	↓	2400	2270	89	89	84	84	5	5.5

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

LDC #: 24449 A va
SDG #: Ste Cove

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: SW
2nd Reviewer: e

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS 280- 27100/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2540	NA	2060	NA	81	81				
Pentachlorophenol		↓		↓						
Pyrene	2540	↓	1990	↓	78	78				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24440 A2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: Q

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #4, SS:

Conc. = $\frac{(56944)(40)(1\ ml)()()}{(785705)(0.2310)(30.6\ g)(0.916)()}$

= 449.7

≈ 450 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

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:	December 8, 2010
Matrix:	Soil/Water
Parameters:	Chlorinated Pesticides
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6290-1

Sample Identification

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-08102010
SSAJ3-05-12BPCMS
SSAJ3-05-12BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 13 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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 Superfund Organic Methods Data Review (June 2008).

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. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Retention time windows were evaluated and considered technically acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits for all compounds.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

Sample EB-08102010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAJ3-05-1BPC	Not specified	Decachlorobiphenyl	422 (63-124)	All TCL compounds except beta-BHC Hexachlorobenzene	J+ (all detects)	A
SSAJ3-05-8BPC	Not specified	Decachlorobiphenyl	226 (63-124)	All TCL compounds	J+ (all detects)	P
SSAJ3-07-1BPC	Not specified	Decachlorobiphenyl	1450 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
SSAJ3-07-5BPC	Not specified	Decachlorobiphenyl	143 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
SSAJ3-07-5BPC (2X)	Not specified	Decachlorobiphenyl	160 (63-124)	Hexachlorobenzene	J+ (all detects)	A
SSAJ3-07-8BPC	Not specified	Decachlorobiphenyl	150 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
SSAJ3-07-8BPC (2X)	Not specified	Decachlorobiphenyl	158 (63-124)	Hexachlorobenzene	J+ (all detects)	A
SB03-24BPC	Not specified	Tetrachloro-m-xylene Decachlorobiphenyl	501 (59-115) 4170 (63-124)	All TCL compounds except beta-BHC Hexachlorobenzene 4,4'-DDD 4,4'-DDE 4,4'-DDT	J+ (all detects)	A

VII. 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.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria for samples on which an Stage 4 review was performed.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6290-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6290-1	SSAJ3-05-1BPC	All TCL compounds except beta-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6290-1	SSAJ3-05-8BPC	All TCL compounds	J+ (all detects)	P	Surrogate recovery (%R) (s)
280-6290-1	SSAJ3-07-1BPC SSAJ3-07-5BPC SSAJ3-07-8BPC	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6290-1	SSAJ3-07-5BPC (2X) SSAJ3-07-8BPC (2X)	Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6290-1	SB03-24BPC	All TCL compounds except beta-BHC Hexachlorobenzene 4,4'-DDD 4,4'-DDE 4,4'-DDT	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6290-1	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-08102010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449A3a
SDG #: 280-6290-1
Laboratory: Test America

Date: 12-3-10
Page: 1 of 1
Reviewer: W
2nd Reviewer: 9

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20%, r²
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	EB=12

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

1	SSAJ3-05-12BPC S	11	SB03-24BPC S	21		31	280-26986-BLK S
2	SSAJ3-05-16BPC**	12	EB-08102010 W	22		32	280-27027-BLK W
3	SSAJ3-05-1BPC	13	SSAJ3-05-12BPCMS S	23		33	280-27469-BLK S
4	SSAJ3-05-5BPC	14	SSAJ3-05-12BPCMSD S	24		34	
5	SSAJ3-05-8BPC	15		25		35	
6	SSAJ3-07-12BPC	16		26		36	
7	SSAJ3-07-17BPC	17		27		37	
8	SSAJ3-07-1BPC	18		28		38	
9	SSAJ3-07-5BPC	19		29		39	
10	SSAJ3-07-8BPC	20		30		40	

LDC #24449A3Q
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: RA
2nd Reviewer: [illegible]

Method: Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	✓			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 24449A3a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MT
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. 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 QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN

Notes:_____

LDC #: 24449A3c
SDG #: See cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

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

METHOD: GC Pesticides/PCB's (EPA SW 846 Method 8081/8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		3 (dets)	NS	B	422 (63-124)	J+dets/A (All except B, FF) (S)
		3(5X) (dets)	NS	B	495 (63-124)	no qual, dil ≥ 5X
		5 (dets)	NS	B	226 (63-124)	J+dets/P (S)
		8 (dets)	NS	B	1450 (63-124)	J+dets/A (All except FF) (S)
		8(50X) (dets)	NS	A	0 (59-115)	no qual, dil ≥ 5X
			↓	B	1700 (63-124)	↓
		9 (dets)	NS	B	143 (63-124)	J+dets/A (All except FF) (S)
		9(2X) (dets)	NS	B	160 (63-124)	J+dets/A (FF only) (S)
		10 (dets)	NS	B	150 (63-124)	J+dets/A (All except FF) (S)
		10(2X) (dets)	NS	B	158 (63-124)	J+dets/A (FF only) (S)
		11 (dets)	NS	A	501 (59-115)	J+dets/A All except (B, FF, MJ) (S)
			↓	B	4170 (63-124)	↓
		11(200X) (dets)	NS	A	232 (59-115)	no qual, dil ≥ 5X
			↓	B	4590 (63-124)	↓

Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

LDC # 24449A3a
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: WF
2nd Reviewer: a

METHOD: EPA 8081 Pesticides

Parameter: O

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	O	Point 1	33015	4.00
			Point 2	78046	10
			Point 3	193282	25
			Point 4	386784	50
			Point 5	5.82E+05	75
			Point 6	7.56E+05	100

Regression Output: Regression Output:		Reported	
Constant	4036.64703	c =	
R Squared	0.99968	r^2 =	0.99990
		b(X)	a(X^2)
X Coefficient(s)	7594.47393		

LDC # 24449d5a
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

METHOD: EPA 8081 Pesticides

Parameter: D

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	D	Point 1	47007	4.00
			Point 2	113757	10
			Point 3	286925	25
			Point 4	575154	50
			Point 5	8.65E+05	75
			Point 6	1.14E+06	100

Regression Output: Regression Output:		Reported	
Constant	2335.32120	c =	
R Squared	0.99986	r^2 =	0.99900
		b(X)	a(X^2)
X Coefficient(s)	11398.00028		

LDC #: 24449A3a
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

Method: EPA 8081 Pesticides

Compound: O

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	59795.00	4.000	16
		137046	10	100
		321682	25	625
		607290	50	2500
		883436	75	5625
		1123921	100	10000

Regression Output

Constant	*c*	*8705.2718*
Std Err of Y Est		
R Squared		*0.9999607*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*1.2932E+04*	*-1.766E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999980*
Coefficient of Determination (r^2)		*0.999961*

LDC #: 24449A39
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: KJT
2nd Reviewer: 9

Method: EPA 8081 Pesticides

Compound: D

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	97207.00	4.000	16
		224034	10	100
		524202	25	625
		979408	50	2500
		1404491	75	5625
		1780195	100	10000

Regression Output

Constant	*c*	*15757.2149*
Std Err of Y Est		
R Squared		*0.9999847*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*2.1051E+04*	*-3.406E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999992*
Coefficient of Determination (r^2)		*0.999985*

LDC #: 24449A39
SDG #: Fee cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Percent difference (%D) = 100 * (N - C)/N

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	014F140.D	8/19/10	D (ClnA)	50.0	49.0	49.0	2.1	2.1
			O ↓	50.0	50.4	50.4	0.7	0.7
			D (ClnB)	50.0	46.8	46.8	6.4	6.4
			O ↓	50.0	46.5	46.5	7.0	7.0
2								
3								
4								

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

LDC #: 24449A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene	A	20.00	16.8018	84	84	0
Tetrachloro-m-xylene	B	20.00	15.5759	78	78	0
Decachlorobiphenyl	A	20.00	~~16.8018~~ 18.3821	92	92	0
Decachlorobiphenyl	B	20.00	18.1175	91	91	0

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 24444A5q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: AT
2nd Reviewer: JR

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 13/14

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gamma-BHC	17.4	17.2	ND	14.8	15.2	85	85	88	88	2	3
4,4'-DDT	17.4	17.2	ND	15.5	16.0	90	90	93	93	3	3
Aroclor 1260											

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

LDC #: 24449A29

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: ___ of ___

Reviewer: VT

2nd Reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration

RPD = | LCS - LCSD | * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery; LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 280-26986-LCS

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.2	n/a	14.8	n/a	91	91				
4,4'-DDT	16.2	n/a	15.8	n/a	98	98				
Aroclor 1260										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24444A3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: KK
2nd reviewer: Q

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

~~Y~~ N N/A Were all reported results recalculated and verified for all level IV samples?
~~Y~~ N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Example:

Sample I.D. 2 AW :

Conc. = ( ) / ( )

= ND

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 12 through August 13, 2010
LDC Report Date:	December 8, 2010
Matrix:	Soil/Water
Parameters:	Chlorinated Pesticides
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6385-1

Sample Identification

BDT-4-S-10-10BPC
BDT-4-S-10-12BPC
BDT-4-S-10-14BPC
BDT-4-S-10-16BPC
BDT-4-S-10-18BPC**
BDT-4-S-10-2BPC
BDT-4-S-10-4BPC
BDT-4-S-10-6BPC
BDT-4-S-10-8BPC
SSAL8-02-10BPC**
SSAL8-02-1BPC
SSAL8-02-5BPC
BDT-4-S-15-10BPC
BDT-4-S-15-10BPC_FD
BDT-4-S-15-12BPC
BDT-4-S-15-14BPC
BDT-4-S-15-16BPC
BDT-4-S-15-18BPC**
BDT-4-S-15-2BPC
BDT-4-S-15-4BPC
BDT-4-S-15-6BPC
BDT-4-S-15-8BPC
EB-08122010
SSAL8-02-1BPCMS
SSAL8-02-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 24 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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 Superfund Organic Methods Data Review (June 2008).

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. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Retention time windows were evaluated and considered technically acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/21/10	048F4801.D	A	4,4'-DDD	22.6	BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC	J+ (all detects)	A

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

Sample EB-08122010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-4-S-10-12BPC	Not specified	Decachlorobiphenyl	131 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A
BDT-4-S-10-2BPC	Not specified	Decachlorobiphenyl	136 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A
SSAL8-02-10BPC**	Not specified	Decachlorobiphenyl	536 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A
SSAL8-02-1BPC	Not specified	Tetrachloro-m-xylene Decachlorobiphenyl	132 (59-115) 5260 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A
SSAL8-02-5BPC	Not specified	Decachlorobiphenyl	283 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A
BDT-4-S-15-10BPC	Not specified	Decachlorobiphenyl	167 (63-124)	All TCL compounds except 4,4'-DDE	J+ (all detects)	A
BDT-4-S-15-10BPC_FD	Not specified	Decachlorobiphenyl	196 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-4-S-15-4BPC	Not specified	Decachlorobiphenyl	700 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A
BDT-4-S-15-8BPC	Not specified	Decachlorobiphenyl	134 (63-124)	All TCL compounds except 4,4'-DDE	J+ (all detects)	A
BDT-4-S-15-8BPC (2X)	Not specified	Decachlorobiphenyl	134 (63-124)	4,4'-DDE	J+ (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) were not within QC limits for several compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
280-27268-LCS/D (EB-08122010)	Toxaphene	152 (63-118)	135 (63-118)	-	J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria for samples on which an Stage 4 review was performed.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
SSAL8-02-10BPC**	4,4'-DDD beta-BHC Endrin ketone Methoxychlor	79.8 66.2 112.3 192.3	J (all detects) J (all detects) J (all detects) J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6385-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-S-15-10BPC and BDT-4-S-15-10BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-15-10BPC	BDT-4-S-15-10BPC_FD				
4,4'-DDE	110	130	17 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-15-10BPC	BDT-4-S-15-10BPC_FD				
4,4'-DDT	33	36	9 (≤50)	-	-	-
beta-BHC	2.6	3.5	-	0.9 (≤1.8)	-	-
Hexachlorobenzene	12	13	8 (≤50)	-	-	-
Methoxychlor	0.77	1.6	-	0.8 (≤2.5)	-	-
Endrin ketone	1.8U	0.83	-	0.3 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6385-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6385-1	BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC	4,4'-DDD	J+ (all detects)	A	Continuing calibration (%D) (c)
280-6385-1	BDT-4-S-10-12BPC BDT-4-S-10-2BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-4BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6385-1	SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6385-1	BDT-4-S-15-10BPC BDT-4-S-15-8BPC	All TCL compounds except 4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6385-1	BDT-4-S-15-8BPC (2X)	4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6385-1	EB-08122010	Toxaphene	J+ (all detects)	P	Laboratory control samples (%R) (l)
280-6385-1	SSAL8-02-10BPC**	4,4'-DDD beta-BHC Endrin ketone Methoxychlor	J (all detects) J (all detects) J (all detects) J (all detects)	A	Project Quantitation Limit (RPD) (dc)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6385-1	BDT-4-S-10-10BPC BDT-4-S-10-12BPC BDT-4-S-10-14BPC BDT-4-S-10-16BPC BDT-4-S-10-18BPC** BDT-4-S-10-2BPC BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC BDT-4-S-15-18BPC** BDT-4-S-15-2BPC BDT-4-S-15-4BPC BDT-4-S-15-6BPC BDT-4-S-15-8BPC EB-08122010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449B3a
SDG #: 280-6385-1
Laboratory: Test America

Date: 12-6-10
Page: 1 of 1
Reviewer: M
2nd Reviewer: G

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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: 8/12-13/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	r^2 %RSD ≤ 20 %
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 20 %
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	FD = 13 + 14
XV.	Field blanks	ND	EB = 23

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

1	BDT-4-S-10-10BPC S	11	SSAL8-02-1BPC S	21	BDT-4-S-15-6BPC S	31	280-27469-BLK S
2	BDT-4-S-10-12BPC	12	SSAL8-02-5BPC	22	BDT-4-S-15-8BPC S	32	280-27268-BLK W
3	BDT-4-S-10-14BPC	13	BDT-4-S-15-10BPC	23	EB-08122010 W	33	280-27479-BLK S
4	BDT-4-S-10-16BPC	14	BDT-4-S-15-10BPC_FD	24	SSAL8-02-1BPCMS S	34	
5 Dup	BDT-4-S-10-18BPC**	15	BDT-4-S-15-12BPC	25	SSAL8-02-1BPCMSD S	35	
6	BDT-4-S-10-2BPC	16	BDT-4-S-15-14BPC	26		36	
7	BDT-4-S-10-4BPC	17	BDT-4-S-15-16BPC	27		37	
8	BDT-4-S-10-6BPC	18 ND	BDT-4-S-15-18BPC**	28		38	
9	BDT-4-S-10-8BPC	19	BDT-4-S-15-2BPC	29		39	
10 Dup	SSAL8-02-10BPC**	20	BDT-4-S-15-4BPC	30		40	

LDC #: 24449B3a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MT
2nd Reviewer: [illegible]

Method: Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? X %D or ____ %R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	✓			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?		✓		
VII. Matrix spike/Matrix spike duplicates				

LDC #: 24449B3a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MT
2nd Reviewer: QT

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD Soil / Water	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
VIII. 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 QC limits?		✓		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L. Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes: _____

LDC #: 24419B3a
SDG #: EE Cove6

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

(Y) N N/A	Were Evaluation mix standards run before initial calibration and before samples?
(Y) N N/A	Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?
(Y) N N/A	Was at least one standard run daily to verify the working curve?
Y (N) N/A	Did the continuing calibration standards meet the percent difference (%D) of ≤20.0%?
Level IV/D Only	
(Y) N N/A	Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	Associated Samples	Qualifications
	8/21/10	048F4801.D	A	M	22.6	( )	7-17	J+dets/A (C)
						( )	(Det + ND)	
						( )		
						( )		
						( )		
						( )		
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A alpha-BHC
B beta-BHC
C delta-BHC
D gamma-BHC
E Heptachlor
F Aldrin
G Heptachlor epoxide
H. Endosulfan I
I. Dieldrin
J. 4,4'-DDE
K. Endrin
L. Endosulfan II
M 4,4'-DDD
N Endosulfan sulfate
O 4,4'-DDT
P Methoxychlor
Q. Endrin ketone
R. Endrin aldehyde
S. alpha-Chlordane
T. gamma-Chlordane
U. Toxaphene
V. Aroclor-1016
W. Aroclor-1221
X. Aroclor-1232
Y Aroclor-1242
Z Aroclor-1248
AA. Aroclor-1254
BB Aroclor-1260
CC. 2,4'-DDD
DD 2,4'-DDE
EE. 2,4'-DDT
FF Hexachlorobenzene
GG. Chlordane
HH. Chlordane (Technical)

LDC #: 24449B5a
SDG #: See cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 2
Reviewer: JT
2nd Reviewer: C

METHOD: GC Pesticides/PCB's (EPA SW 846 Method 8081/8082)

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

Y N N/A Were surrogates spiked into all samples and blanks?
Y ~~N~~ N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		2 (~~Dups~~)	NS	B	131 (63-124)	J+ dets/A (ALL except J,O) (S)
		6 (~~dups~~)	NS	B	136 (63-124)	J+ dets/A (ALL except J,O) (S)
		10 (dups)		B	536 (63-124)	J+ dets/A (ALL except J,O, FF) (S)
		10 (10x) (~~dups~~)		B	520 (63-124)	no qual, dil ≥ 5x
		11 (~~dups~~)	NS	A	132 (59-115)	J+ dets/A (ALL except J,O, FF) (S)
		↓	↓	B	5260 (63-124)	↓
		11 (100x) (dups)	NS	A	0 (59-115)	no qual, dil ≥ 5x
				B	5810 (63-124)	↓
		12 (~~dups~~)	NS	B	283 (63-124)	J+ dets/A (ALL except J,O, FF) (S)
		12 (10x) (~~dups~~)	NS	B	265 (63-124)	no qual, dil ≥ 5x
		13 (~~Dups~~)	NS	B	167 (63-124)	J+ dets/A (ALL except J) (S)
		13 (5x) (~~dups~~)	NS	B	165 (63-124)	no qual, dil ≥ 5x
		14 (~~dups~~)	NS	B	196 (63-124)	J+ dets/A (ALL except J,O) (S)

Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

LDC #: 14479B39
SDG #: See Cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Reviewer: MT
2nd Reviewer: 9

METHOD: GC Pesticides/PCB's (EPA SW 846 Method 8081/8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		14 (5X)(DL5)	NS	B	198 (63-124)	no qual, dil ≥ 5X
		20 (DL5)	NS	B	700 (63-124)	J+ dets / A (ALL except J,O) (S)
		20 (50X) (Dets)	NS	B	730 (63-124)	no qual, dil ≥ 5X
		22	NS	B	134 (63-124)	J+ dets / A (ALL except J) (S)
		22 (2X)	NS	B	134 (63-124)	J+ dets / A (only J) (S)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

LDC #: 24449B3a
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: X GC __ HPLC

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

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

(Y) N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	24/25		( )	( )	( )	11	
			( )	( )	( )		
			( )	( )	( )		See attached
		See Attached	( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

Quality Control Results

Client: Northgate Environmental Management Inc.

Job Number: 280-6385-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 280-27469

Method: 8081A
Preparation: 3550C

MS Lab Sample ID:	280-6385-11	Analysis Batch: 280-28568	Instrument ID: GCS_P2
Client Matrix:	Solid	Prep Batch: 280-27469	Lab File ID: 065F6501.D
Dilution:	1.0		Initial Weight/Volume: 30.1 g
Date Analyzed:	08/21/2010 0814		Final Weight/Volume: 10000 uL
Date Prepared:	08/18/2010 1850		Injection Volume:
			Column ID: PRIMARY

MSD Lab Sample ID:	280-6385-11	Analysis Batch: 280-28568	Instrument ID: GCS_P2
Client Matrix:	Solid	Prep Batch: 280-27469	Lab File ID: 066F6601.D
Dilution:	1.0		Initial Weight/Volume: 30.1 g
Date Analyzed:	08/21/2010 0830		Final Weight/Volume: 10000 uL
Date Prepared:	08/18/2010 1850		Injection Volume:
			Column ID: PRIMARY

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
4,4'-DDD M	115	122	57 - 118	7	20		F
4,4'-DDE J	-22500	-21200	61 - 115	14	15	E 4	
4,4'-DDT O	-4260	-3470	53 - 125	16	29	E 4	E 4
Aldrin	82	85	60 - 115	3	50		
alpha-BHC A	93	154	54 - 115	45	17		F
alpha-Chlordane S	0	0	60 - 115	NC	18	U F	U F
beta-BHC B	269	376	58 - 115	25	17	F	E F
delta-BHC C	111	129	62 - 115	15	19		F
Dieldrin I	0	0	63 - 117	NC	25	U F	U F
Endosulfan I H	0	0	55 - 115	NC	26	U F	U F
Endosulfan II L	0	0	60 - 115	NC	20	U F	U F
Endosulfan sulfate N	351	0	58 - 118	NC	22	E F	U F
Endrin K	458	458	61 - 121	0	30	E F	E F
Endrin aldehyde	85	68	54 - 115	23	29		
Endrin ketone	106	70	61 - 118	13	20	E	E
gamma-BHC (Lindane)	90	98	59 - 115	8	24		
gamma-Chlordane T	347	487	60 - 115	33	21	E F	E F
Heptachlor	82	92	61 - 115	11	18		
Heptachlor epoxide G	0	0	62 - 112	NC	18	U F	U F
Hexachlorobenzene FF	-4220	-3220	50 - 130	36	25	E 4	E 4 F
Methoxychlor P	0	0	52 - 123	NC	23	U F	U F

no qual
LCS ok

Surrogate	MS % Rec		MSD % Rec		Acceptance Limits
DCB Decachlorobiphenyl	5530	E X	5220	E X	63 - 124
Tetrachloro-m-xylene	141	X	168	X	59 - 115

Surrogate	MS % Rec		MSD % Rec		Acceptance Limits
DCB Decachlorobiphenyl	10100	E X	9480	E X	63 - 124
Tetrachloro-m-xylene	104		158	X	59 - 115

3/3

Quality Control Results

Client: Northgate Environmental Management Inc.

Job Number: 280-6385-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 280-27469

Method: 8081A
Preparation: 3550C

MS Lab Sample ID:	280-6385-11	Analysis Batch: 280-28568	Instrument ID: GCS_P2
Client Matrix:	Solid	Prep Batch: 280-27469	Lab File ID: 067F6701.D
Dilution:	1.0		Initial Weight/Volume: 30.1 g
Date Analyzed:	08/21/2010 0847		Final Weight/Volume: 10000 uL
Date Prepared:	08/18/2010 1850		Injection Volume:
			Column ID: PRIMARY

MSD Lab Sample ID:	280-6385-11	Analysis Batch: 280-28568	Instrument ID: GCS_P2
Client Matrix:	Solid	Prep Batch: 280-27469	Lab File ID: 068F6801.D
Dilution:	1.0		Initial Weight/Volume: 30.1 g
Date Analyzed:	08/21/2010 0903		Final Weight/Volume: 10000 uL
Date Prepared:	08/18/2010 1850		Injection Volume:
			Column ID: PRIMARY

Analyte		% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Toxaphene	U	13000	13300	54 - 135	2	23	E F	E F

Surrogate	MS % Rec		MSD % Rec		Acceptance Limits
DCB Decachlorobiphenyl	4820	E X	5270	E X	63 - 124
Tetrachloro-m-xylene	108		183	X	59 - 115

LDC #: 24449B2g
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: X GC __ HPLC

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

(Y) N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

Y (N) N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only

(Y) N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	280-27268-LCS/D	U	152 (63-118)	135 (63-118)	( )	ALL H2O (ND)	J+ dets/P (L)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 24449B3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: M
2nd Reviewer: Q

METHOD: X GC __ HPLC

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

Y (N) N/A Did the percent difference of detected compounds between two columns./detectors ≤40%?

#	Compound Name	Sample ID	(%RPD)/%D Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	M	10	79.8	J dets/A (dc)
	O		66.2	↓
	Q		112.3	↓
	P		192.3	↓

LDC #: 24447D3a
SDG #: Encompassing

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: X GC __ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit 50	Qualification Parent only / All Samples
	13	14		
J	110	130	17	
O	33	36	9	
B	2.6	3.5	0.9 (Diff)(≤1.8)	
FF	12	13	8	
P	0.77	1.6	0.83 (Diff)(≤7.5)	
Q	~~0.52~~ U 1.8	0.83	0.3 (Diff)(≤1.8)	

Compound	Concentration ( )		%RPD Limit ____	Qualification Parent only / All Samples

LDC # 24449b3a
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: WP
2nd Reviewer: [illegible]

METHOD: EPA 8081 Pesticides

Parameter: O

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	O	Point 1	33015	4.00
			Point 2	78046	10
			Point 3	193282	25
			Point 4	386784	50
			Point 5	5.82E+05	75
			Point 6	7.56E+05	100

Regression Output: Regression Output:		Reported	
Constant	4036.64703	c =	
R Squared	0.99968	r^2 =	0.99990
		b(X)	a(X^2)
X Coefficient(s)	7594.47393		

LDC # 24449B3a
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

METHOD: EPA 8081 Pesticides

Parameter: D

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	D	Point 1	47007	4.00
			Point 2	113757	10
			Point 3	286925	25
			Point 4	575154	50
			Point 5	8.65E+05	75
			Point 6	1.14E+06	100

Regression Output: Regression Output:		Reported	
Constant	2335.32120	c =	
R Squared	0.99986	r^2 =	0.99900
		b(X)	a(X^2)
X Coefficient(s)	11398.00028		

LDC #: 24449B34
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

Method: EPA 8081 Pesticides

Compound: O

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	59795.00	4.000	16
		137046	10	100
		321682	25	625
		607290	50	2500
		883436	75	5625
		1123921	100	10000

Regression Output

Constant	*c*	*8705.2718*
Std Err of Y Est		
R Squared		*0.9999607*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*1.2932E+04*	*-1.766E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999980*
Coefficient of Determination (r^2)		*0.999961*

LDC #: 24449B6a
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: AT
2nd Reviewer: 9

Method: EPA 8081 Pesticides

Compound: D

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	97207.00	4.000	16
		224034	10	100
		524202	25	625
		979408	50	2500
		1404491	75	5625
		1780195	100	10000

Regression Output

Constant	*c*	*15757.2149*
Std Err of Y Est		
R Squared		*0.9999847*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*2.1051E+04*	*-3.406E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999992*
Coefficient of Determination (r^2)		*0.999985*

LDC #: 24491b39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 2
Reviewer:
2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Percent difference (%D) = 100 * (N - C)/N

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	035F3501.D	8/21/10	D (ChA)	50.0	50.1	50.1	0.2	0.2
			O ↓	50.0	49.4	49.4	1.2	1.2
			D (ChB)	50.0	50.2	50.2	0.3	0.3
			O ↓	50.0	50.2	50.2	0.5	0.5
2	048F4801.D	8/21/10	D (ChA)	50.0	51.3	51.3	2.6	2.6
			O ↓	50.0	50.8	50.8	1.6	1.6
			D (ChB)	50.0	51.6	51.6	3.2	3.2
			O ↓	50.0	53.6	53.6	7.2	7.2
3	061F6101.D	8/21/10	D (ChA)	50.0	49.8	49.8	0.5	0.5
			O ↓	50.0	49.6	49.6	0.8	0.8
			D (ChB)	50.0	50.2	50.2	0.4	0.4
			O ↓	50.0	51.8	51.8	3.6	3.6
4	005F0501.D	8/22/10	D (ChA)	50.0	48.9	48.9	2.2	2.2
			O ↓	50.0	49.5	49.5	1.0	1.0
			D (ChB)	50.0	47.4	47.4	5.3	5.3
			O ↓	50.0	47.0	47.0	5.9	5.9

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

LDC #: 24449B3Q
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: MT
2nd Reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Percent difference (%D) = 100 * (N - C)/N

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	018F1801D	8/22/10	D (Cl.A)	50.0	49.3	49.3	1.4	1.4
			O ↓	50.0	50.2	50.2	0.5	0.5
			D (Cl.B)	50.0	~~49.3~~ 47.9	47.9	~~1.4~~ 4.2	4.2
			O ↓	50.0	49.5	49.5	1.1	1.1
2	045F501D	8/23/10	D (Cl.A)	50.0	49.1	49.1	1.8	1.8
			O ↓	50.0	49.3	49.3	1.4	1.4
			D (Cl.B)	50.0	47.4	47.4	5.1	5.1
			O ↓	50.0	48.8	48.8	2.4	2.4
3								
4								

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

LDC #: 24449B3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 5

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	A	20.00	16.3495	82	82	0
Tetrachloro-m-xylene	B	20.00	16.8815	84	84	0
Decachlorobiphenyl	A	20.00	19.1099	96	96	0
Decachlorobiphenyl	B	20.00	19.4936	97	97	0

Sample ID: ______

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID: ______

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID: ______

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes: ______

LDC #: 25449B2a
SDG #: Eaccaa

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 24/25

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gamma-BHC	17.3	17.3	ND	15.6	17.0	90	90	98	98	8	8
4,4'-DDT	17.3	17.3	840	762	899	-4260	~~-3470~~	-3470	341	16	16
Aroclor 1260							-451				

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

LDC #: 24496J9
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Reviewer: MF
2nd Reviewer: CD

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 280-27469 -LCS

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.2	n/a	12.9	n/a	80	80				
4,4'-DDT	16.2	n/a	13.8	n/a	85	85				
Aroclor 1260										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24449B39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: LH
2nd reviewer:

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$y = mx + b$

$b = 4036.64$

$M = 7594.47$

Example:

Sample I.D. 5 0 :

Conc. $= \frac{\left(\frac{(49672 - 4036.65)}{(7594.47)}\right)(10\,mL)(1x)}{(30.5\,g)(.924)}$

$= 2.1\ ug/kg$

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 13 through August 16, 2010

LDC Report Date: December 8, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6415-1

Sample Identification

EB-08162010
EB-08132010
BDT-4-N-15-2BPC
BDT-4-N-15-2BPC_FD
BDT-4-N-15-4BPC
BDT-4-N-15-6BPC
BDT-4-S-20-2BPC
BDT-4-S-20-4BPC
BDT-4-S-20-6BPC
BDT-4-S-20-8BPC
BDT-4-S-20-10BPC
BDT-4-S-20-12BPC
BDT-4-S-20-14BPC
BDT-4-S-20-16BPC
BDT-4-S-20-18BPC**
BDT-4-S-20-8BPC_FD
BDT-4-N-10-10BPC
BDT-4-N-10-12BPC
BDT-4-N-10-14BPC
BDT-4-N-10-14BPC_FD
BDT-4-N-10-16BPC
BDT-4-N-10-18BPC**
BDT-4-N-10-2BPC
BDT-4-N-10-4BPC
BDT-4-N-10-6BPC
BDT-4-N-10-8BPC
BDT-4-N-15-2BPC_FDMS
BDT-4-N-15-2BPC_FDMSD
BDT-4-N-10-2BPCMS
BDT-4-N-10-2BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 28 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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 Superfund Organic Methods Data Review (June 2008).

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. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Retention time windows were evaluated and considered technically acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits for all compounds.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

Samples EB-08162010 and EB-08132010 was identified as equipment blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. 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.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria for samples on which an Stage 4 review was performed.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
BDT-4-N-10-18BPC**	beta-BHC	53.2	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6415-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-N-15-2BPC and BDT-4-N-15-2BPC_FD and samples BDT-4-S-20-8BPC and BDT-4-S-20-8BPC_FD and samples BDT-4-N-10-14BPC and BDT-4-N-10-14BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-15-2BPC	BDT-4-N-15-2BPC_FD				
beta-BHC	0.72	0.66U	-	0.06 (≤1.8)	-	-
Hexachlorobenzene	21	9.2	78 (≤50)	-	J (all detects)	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-20-8BPC	BDT-4-S-20-8BPC_FD				
4,4'-DDE	4.4	1.5	-	2.9 (≤1.8)	J (all detects)	A
4,4'-DDT	1.3	0.62U	-	0.58 (≤1.8)	-	-
Hexachlorobenzene	0.44	0.29U	-	0.15 (≤1.8)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-10-14BPC	BDT-4-N-10-14BPC_FD				
beta-BHC	1.6	1.6	-	0 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6415-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6415-1	BDT-4-N-10-18BPC**	beta-BHC	J (all detects)	A	Project Quantitation Limit (RPD) (dc)
280-6415-1	EB-08162010 EB-08132010 BDT-4-N-15-2BPC BDT-4-N-15-2BPC_FD BDT-4-N-15-4BPC BDT-4-N-15-6BPC BDT-4-S-20-2BPC BDT-4-S-20-4BPC BDT-4-S-20-6BPC BDT-4-S-20-8BPC BDT-4-S-20-10BPC BDT-4-S-20-12BPC BDT-4-S-20-14BPC BDT-4-S-20-16BPC BDT-4-S-20-18BPC** BDT-4-S-20-8BPC_FD BDT-4-N-10-10BPC BDT-4-N-10-12BPC BDT-4-N-10-14BPC BDT-4-N-10-14BPC_FD BDT-4-N-10-16BPC BDT-4-N-10-18BPC** BDT-4-N-10-2BPC BDT-4-N-10-4BPC BDT-4-N-10-6BPC BDT-4-N-10-8BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6415-1	BDT-4-N-15-2BPC BDT-4-N-15-2BPC_FD	Hexachlorobenzene	J (all detects)	A	Field differences (RPD) (fd)
280-6415-1	BDT-4-S-20-8BPC BDT-4-S-20-8BPC_FD	4,4'-DDE	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6415-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6415-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449C3a
SDG #: 280-6415-1
Laboratory: Test America

Date: 12-6-10
Page: 1 of 1
Reviewer: VK
2nd Reviewer: [signature]

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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: 8/13/10, 8/16/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	1°, %RSD ≤ 20 %
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	FD=3+4, 15+16, 19+20
XV.	Field blanks	ND	FB = 1, 2

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

1	EB-08162010 W	11	BDT-4-S-20-10BPC S	21	BDT-4-N-10-16BPC S	31	280-27602-BLK W
2	EB-08132010 W	12	BDT-4-S-20-12BPC	22	BDT-4-N-10-18BPC**	32	280-27479-BLK S
3	BDT-4-N-15-2BPC S	13	BDT-4-S-20-14BPC	23	BDT-4-N-10-2BPC	33	280-27779-BLK S
4	BDT-4-N-15-2BPC_FD	14	BDT-4-S-20-16BPC	24	BDT-4-N-10-4BPC	34	
5	BDT-4-N-15-4BPC	15	BDT-4-S-20-18BPC**	25	BDT-4-N-10-6BPC	35	
6	BDT-4-N-15-6BPC	16	BDT-4-S-20-8BPC_FD	26	BDT-4-N-10-8BPC	36	
7	BDT-4-S-20-2BPC	17	BDT-4-N-10-10BPC	27	BDT-4-N-15-2BPC_FDMS	37	
8	BDT-4-S-20-4BPC	18	BDT-4-N-10-12BPC	28	BDT-4-N-15-2BPC_FDMSD	38	
9	BDT-4-S-20-6BPC	19	BDT-4-N-10-14BPC	29	BDT-4-N-10-2BPCMS	39	
10	BDT-4-S-20-8BPC	20	BDT-4-N-10-14BPC_FD	30	BDT-4-N-10-2BPCMSD	40	

LDC #: 24449C34
SDG #: Src Coord

VALIDATION FINDINGS CHECKLIST

Reviewer: LA
2nd Reviewer: g

Method: Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ____ %R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	✓			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 24449C3a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: VR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD Soil / Water	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. 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 QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ
E Heptachlor	M. 4,4'-DDD	U Toxaphene	CC 2,4'-DDD	KK
F Aldrin	N Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE 2,4'-DDT	MM
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF Hexachlorobenzene	NN

Notes:_____

LDC #: 24449G3G
SDG #: See Cover

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

METHOD: ✓ GC __ HPLC

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

Y (N) N/A Did the percent difference of detected compounds between two columns./detectors ≤40%?

#	Compound Name	Sample ID	(%RPD)/%D Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	B	22	53.2	J dets/A (dc)

LDC #: 24419C3
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: X GC __ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg) 3	Concentration (ug/kg) 4	%RPD Limit 50	Qualification Parent only / All Samples
B	0.72	0.66 U	0.4 (DM)(≤1.8)	
FF	21	9.2	78	~~J (all)~~ J (all SAs) (fd)

Compound	Concentration (ug/kg) 10	Concentration (ug/kg) 16	~~%RPD~~ Diff Limit ≤1.8	Qualification Parent only / All Samples
J	4.4	1.5	2.9	J (all SAs) (fd)
O	1.3	0.62 U	0.68	
FF	0.44	0.29 U	0.15	

LDC #: 44497C5G
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: DT
2nd reviewer: S

METHOD: X GC __ HPLC

(X) N N/A Were field duplicate pairs identified in this SDG?
(X) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD or RPD Limit 51.8	Qualification Parent only / All Samples
	19	20		
B	1.6	1.6	0	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC # 24449C3a
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 1st
2nd Reviewer: 2

METHOD: EPA 8081 Pesticides

Parameter: D

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	D	Point 1	47007	4.00
			Point 2	113757	10
			Point 3	286925	25
			Point 4	575154	50
			Point 5	8.65E+05	75
			Point 6	1.14E+06	100

Regression Output: Regression Output:		Reported	
Constant	2335.32120	c =	
R Squared	0.99986	r^2 =	0.99900
		b(X)	a(X^2)
X Coefficient(s)	11398.00028		

LDC # 24449C39
SDG# see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: DA
2nd Reviewer: R

METHOD: EPA 8081 Pesticides

Parameter: D

Order of regression: Linear

Date	Channel	Compound	Points	x area	y conc
11-Aug-10	Ch. A	D	Point 1	47007	4.00
			Point 2	113757	10
			Point 3	286925	25
			Point 4	575154	50
			Point 5	8.65E+05	75
			Point 6	1.14E+06	100

Regression Output: Regression Output:		Reported	
Constant	2335.32120	c =	
R Squared	0.99986	r^2 =	0.99900
		b(X)	a(X^2)
X Coefficient(s)	11398.00028		

LDC #: 24449C34
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: LG
2nd Reviewer: R

Method: EPA 8081 Pesticides

Compound: O

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	59795.00	4.000	16
		137046	10	100
		321682	25	625
		607290	50	2500
		883436	75	5625
		1123921	100	10000

Regression Output

Constant	*c*	*8705.2718*
Std Err of Y Est		
R Squared		*0.9999607*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*1.2932E+04*	*-1.766E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999980*
Coefficient of Determination (r^2)		*0.999961*

LDC #: 24449C3a
SDG #: See Cover

Validatin Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: MA
2nd Reviewer: 2

Method: EPA 8081 Pesticides

Compound: O

Date	Column	(Y) Response	(X) Conc	(X^2) Conc
8/11/2010	B	59795.00	4.000	16
		137046	10	100
		321682	25	625
		607290	50	2500
		883436	75	5625
		1123921	100	10000

Regression Output

Constant	*c*	*8705.2718*
Std Err of Y Est		
R Squared		*0.9999607*
Degrees of Freedom		
	a	*b*
X Coefficient(s)	*1.2932E+04*	*-1.766E+01*
Std Err of Coef.		
Correlation Coefficient		*0.999980*
Coefficient of Determination (r^2)		*0.999961*

LDC #: 24449C2q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: LA
2nd Reviewer: 2

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Percent difference (%D) = 100 * (N - C)/N

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	045F45d.D	8/23/10	D (Cl-A)	50.0	49.1	49.1	1.8	1.8
			O (Cl-A)	50.0	43.9	43.9	1.4	1.4
			D (Cl-B)	50.0	47.4	47.4	5.1	5.1
			O (Cl-B)	50.0	48.8	48.8	2.4	2.4
2								
	020F20d.D	8/23/10	D (Cl-A)	50.0	49.9	49.9	0.3	0.3
			O ↓	50.0	51.9	51.9	3.8	3.8
			D (Cl-B)	50.0	48.6	48.6	2.7	2.7
3			O ↓	50.0	51.2	51.2	2.5	2.5
	033F3301.D	8/24/10	D (Cl-A)	50.0	50.3	50.3	0.5	0.5
			O ↓	50.0	52.1	52.1	4.2	4.2
4			D (Cl-B)	50.0	48.5	48.5	3.1	3.1
			O ↓	50.0	51.0	51.0	2.0	2.0

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

LDC #: 24449C3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 22

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	A	20.00	15.9915	80	80	0
Tetrachloro-m-xylene	B	20.00	14.8173	74	74	0
Decachlorobiphenyl	A	20.00	19.4569	97	97	0
Decachlorobiphenyl	B	20.00	17.4009	87	87	0

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 25444C59
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: MF
2nd Reviewer: e

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 27/28

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gamma-BHC	16.6	16.6	ND	13.5	13.4	82	82	81	81	1	1
4,4'-DDT	16.6	16.6	ND	13.9	13.8	84	84	83	83	1	1
Aroclor 1260											

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

LDC #: 24449C35
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: KT
2nd Reviewer: e

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = | LCS - LCSD | * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 280-27479-LCS

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.7	n/a	13.9	n/a	83	83				
4,4'-DDT	16.7	n/a	15.1	n/a	90	90				
Aroclor 1260										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24449C3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: RS
2nd reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$y = ax^2 + bx + c$

$a = -1.354\ E1$

$b = 9.5298\ E3$

$c = 90660254$

Area = $y = 43360$

$x = 3.62$

Example:

Sample I.D. 22 B:

$$\text{Conc.} = \left(\frac{(3.62)\ (10\text{m})\ (1\text{x})}{(43360)\ (3.5\text{g})\ (.8946)} \right)$$

$= 1.3\ \mu g/kg$ ✓

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
			1.3 ug/kg		

Note: _____

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:	December 2, 2010
Matrix:	Soil/Water
Parameters:	Metals
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6290-1

Sample Identification

SSAQ3-03-10BPC	SSAQ5-06-3BPC_FD	SSAJ3-05-12BPCMSD
SSAQ3-03-1BPC	SSAJ2-06-1BPC	
SSAQ3-03-5BPC	SSAJ2-06-3BPC	
SSAQ4-08-10BPC**	SSAJ2-06-5BPC	
SSAQ4-08-10BPC_FD	SSAJ3-05-12BPC	
SSAQ4-08-1BPC	SSAJ3-05-16BPC**	
SSAQ4-08-5BPC	SSAJ3-05-1BPC	
SSAQ4-10-10BPC	SSAJ3-05-5BPC	
SSAQ4-10-1BPC	SSAJ3-05-8BPC	
SSAQ4-10-5BPC	SSAJ3-07-12BPC	
SSAQ5-05-1BPC	SSAJ3-07-17BPC	
SSAQ5-05-2BPC	SSAJ3-07-1BPC	
SSAQ5-05-2BPC_FD	SSAJ3-07-5BPC	
SSAQ5-05-3BPC	SSAJ3-07-8BPC	
RSAQ5-1BPC	SB03-24BPC	
RSAQ5-2BPC	EB-08092010	
RSAQ5-3BPC**	EB-08102010	
SSAQ5-06-1BPC	SSAQ3-03-10BPCMS	
SSAQ5-06-2BPC	SSAQ3-03-10BPCMSD	
SSAQ5-06-3BPC	SSAJ3-05-12BPCMS	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 39 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Zinc	0.430 mg/Kg	SB03-24BPC
ICB/CCB	Antimony Selenium	3.42 ug/L 5.55 ug/L	SB03-24BPC
PB (prep blank)	Barium	0.710 ug/L	All water samples in SDG 280-6290-1
ICB/CCB	Selenium	8.29 ug/L	All water samples in SDG 280-6290-1

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-08092010	Barium Selenium	0.59 ug/L 9.4 ug/L	10U ug/L 15U ug/L
EB-08102010	Barium	1.1 ug/L	10U ug/L

Samples EB-08092010 and EB-08102010 were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-08092010	8/9/10	Barium Selenium	0.59 ug/L 9.4 ug/L	No associated samples in this SDG
EB-08102010	8/10/10	Barium	1.1 ug/L	No associated samples in this SDG

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAQ4-08-10BPC** and SSAQ4-08-10BPC_FD, samples SSAQ5-05-2BPC and SSAQ5-05-2BPC_FD, and samples SSAQ5-06-3BPC and SSAQ5-06-3BPC_FD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAQ4-08-10BPC**	SSAQ4-08-10BPC_FD				
Arsenic	15	14	7 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAQ5-05-2BPC	SSAQ5-05-2BPC_FD				
Arsenic	3.1	3.1	0 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAQ5-06-3BPC	SSAQ5-06-3BPC				
Arsenic	3.2	3.5	9 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Analyte	Flag	A or P	Reason
280-6290-1	SSAQ3-03-10BPC SSAQ3-03-1BPC SSAQ3-03-5BPC SSAQ4-08-10BPC** SSAQ4-08-10BPC_FD SSAQ4-08-1BPC SSAQ4-08-5BPC SSAQ4-10-10BPC SSAQ4-10-1BPC SSAQ4-10-5BPC SSAQ5-05-1BPC SSAQ5-05-2BPC SSAQ5-05-2BPC_FD SSAQ5-05-3BPC RSAQ5-1BPC RSAQ5-2BPC RSAQ5-3BPC** SSAQ5-06-1BPC SSAQ5-06-2BPC SSAQ5-06-3BPC SSAQ5-06-3BPC_FD 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 (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-6290-1	EB-08092010	Barium Selenium	10U ug/L 15U ug/L	A	bl
280-6290-1	EB-08102010	Barium	10U ug/L	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals – Equipment Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449A4
SDG #: 280-6290-1
Laboratory: Test America

Date: 12-1-10
Page: 1 of 1
Reviewer: GR
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020/7000 /6010B)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	RT	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(4,5), (12,13), (20,21)
XV	Field Blanks	SW	EB= 36,37

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	SSAQ3-03-10BPC	S	11	SSAQ5-05-1BPC	S	21	SSAQ5-06-3BPC_FD	S	31	SSAJ3-07-17BPC	S
2	SSAQ3-03-1BPC		12	SSAQ5-05-2BPC		22	SSAJ2-06-1BPC		32	SSAJ3-07-1BPC	
3	SSAQ3-03-5BPC		13	SSAQ5-05-2BPC_FD		23	SSAJ2-06-3BPC		33	SSAJ3-07-5BPC	
4	SSAQ4-08-10BPC**		14	SSAQ5-05-3BPC		24	SSAJ2-06-5BPC		34	SSAJ3-07-8BPC	
5	SSAQ4-08-10BPC_FD		15	RSAQ5-1BPC		25	SSAJ3-05-12BPC		35	SB03-24BPC	
6	SSAQ4-08-1BPC		16	RSAQ5-2BPC		26	SSAJ3-05-16BPC**		36	EB-08092010	W
7	SSAQ4-08-5BPC		17	RSAQ5-3BPC**		27	SSAJ3-05-1BPC		37	EB-08102010	W
8	SSAQ4-10-10BPC		18	SSAQ5-06-1BPC		28	SSAJ3-05-5BPC		38	SSAQ3-03-10BPCMS	S
9	SSAQ4-10-1BPC		19	SSAQ5-06-2BPC		29	SSAJ3-05-8BPC		39	SSAQ3-03-10BPCMSD	
10	SSAQ4-10-5BPC		20	SSAQ5-06-3BPC		30	SSAJ3-07-12BPC		40	SSAJ3-05-12BPCMS	
									41	SSAJ3-05-12BPCMSD	

Notes:

PBW
PBS1
PBS2
PBS3

LDC #: 24449A4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [signature]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike 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 +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24449A4

VALIDATION FINDINGS CHECKLIST

Reviewer: eR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 24449A4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-34		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
35		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
36,37		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
QC 38-41		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___

Comments: Mercury by CVAA if performed

LDC #: 24449A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 35

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Sb			3.42											
Se			5.55											
Zn	0.430													

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	36	37								
Ba		0.710			0.59 / 10	1.1 / 10								
Se			8.29		9.4 / 15									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24449A4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CE
2nd Reviewer: LA

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg

Sampling date: 8/9/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: No associated samples

Analyte	Blank ID	Sample Identification										
	36	Action Level	No Qualifiers									
Ba	0.59											
Se	9.4											

Sampling date: 8/10/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: No associated samples

Analyte	Blank ID	Sample Identification										
	37	Action Level	No Qualifiers									
Ba	1.1											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 24449A4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Metals (EPA Method 6020/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	4	5				
Arsenic	15	14	7			

V:\FIELD DUPLICATES\FD_inorganic\24449A4.wpd

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	13				
Arsenic	3.1	3.1	0			

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	20	21				
Arsenic	3.2	3.5	9			

LDC #: 24449A4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP/MS (Initial calibration)	AS	41.0	40	102	102	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	AS	50.2	50.0	100	100	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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 #: 24448A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units) mg/kg	True / D / SDR (units) mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	104 ug/L	100 ug/L	104	104	Y
LCS	Laboratory control sample		18.9	20	95	95	
38	Matrix spike		(SSR-SR) 18.6	19.6	95	95	
38/39	Duplicate		21.9	21.1	4	4	
1	ICP serial dilution		3.3	3.28	1	1	

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 #: 21449A4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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 and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for AS were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)(5)\left(\frac{29.22\mu g}{1000}\right)}{(1.09g)(0.916)} = 14.63\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	AS	15	15	Y

Note: _____

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 12 through August 13, 2010
LDC Report Date:	December 10, 2010
Matrix:	Soil/Water
Parameters:	Arsenic and Manganese
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6385-1

Sample Identification

BDT-4-S-10-10BPC
BDT-4-S-10-12BPC
BDT-4-S-10-14BPC
BDT-4-S-10-16BPC
BDT-4-S-10-18BPC**
BDT-4-S-10-2BPC
BDT-4-S-10-4BPC
BDT-4-S-10-6BPC
BDT-4-S-10-8BPC
SSAL8-02-10BPC**
SSAL8-02-1BPC
SSAL8-02-5BPC
BDT-4-S-15-10BPC
BDT-4-S-15-10BPC_FD
BDT-4-S-15-12BPC
BDT-4-S-15-14BPC
BDT-4-S-15-16BPC
BDT-4-S-15-18BPC**
BDT-4-S-15-2BPC
BDT-4-S-15-4BPC
BDT-4-S-15-6BPC
BDT-4-S-15-8BPC
EB-08122010
SSAL8-02-1BPCMS
SSAL8-02-1BPCMSD
BDT-4-S-15-10BPCMS
BDT-4-S-15-10BPCMSD
EB-08122010MS
EB-08122010MSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 26 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020 for Arsenic and Manganese.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic or manganese contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.151 mg/Kg	BDT-4-S-10-10BPC BDT-4-S-10-12BPC BDT-4-S-10-14BPC BDT-4-S-10-16BPC BDT-4-S-10-18BPC** BDT-4-S-10-2BPC BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC
PB (prep blank)	Manganese	0.0464 mg/Kg	BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC BDT-4-S-15-18BPC** BDT-4-S-15-2BPC BDT-4-S-15-4BPC BDT-4-S-15-6BPC BDT-4-S-15-8BPC

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Manganese	1.45 ug/L	BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC

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

Samples EB-08122010 and EB-08132010 (from SDG 280-6415-1) were identified as equipment blanks. No arsenic or manganese contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-08132010	8/13/10	Manganese	2.5 ug/L	BDT-4-S-10-10BPC BDT-4-S-10-12BPC BDT-4-S-10-14BPC BDT-4-S-10-16BPC BDT-4-S-10-18BPC** BDT-4-S-10-2BPC BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC BDT-4-S-15-18BPC** BDT-4-S-15-2BPC BDT-4-S-15-4BPC BDT-4-S-15-6BPC BDT-4-S-15-8BPC
EB-08122010	8/12/10	Manganese	1.0 ug/L	SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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 280-6385-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-S-15-10BPC and BDT-4-S-15-10BPC_FD were identified as field duplicates. No arsenic and manganese were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-15-10BPC	BDT-4-S-15-10BPC_FD				
Arsenic	3.9	3.8	3 (≤50)	-	-	-
Manganese	690	760	10 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese - Data Qualification Summary - SDG 280-6385-1

SDG	Sample	Analyte	Flag	A or P	Reason
280-6385-1	BDT-4-S-10-10BPC BDT-4-S-10-12BPC BDT-4-S-10-14BPC BDT-4-S-10-16BPC BDT-4-S-10-18BPC** BDT-4-S-10-2BPC BDT-4-S-10-4BPC BDT-4-S-10-6BPC BDT-4-S-10-8BPC SSAL8-02-10BPC** SSAL8-02-1BPC SSAL8-02-5BPC BDT-4-S-15-10BPC BDT-4-S-15-10BPC_FD BDT-4-S-15-12BPC BDT-4-S-15-14BPC BDT-4-S-15-16BPC BDT-4-S-15-18BPC** BDT-4-S-15-2BPC BDT-4-S-15-4BPC BDT-4-S-15-6BPC BDT-4-S-15-8BPC EB-08122010	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese - Laboratory Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese – Equipment Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449B4
SDG #: 280-6385-1
Laboratory: Test America

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

METHOD: As & Mn (EPA SW 846 Method 6020)

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: 8/12-13/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(13,14)
XV	Field Blanks	SW	EB-23, EB-08132010 (SDG#: 280-6415-1)

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	BDT-4-S-10-10BPC S	11	SSAL8-02-1BPC S	21	BDT-4-S-15-6BPC S	31	PBW
2	BDT-4-S-10-12BPC	12	SSAL8-02-5BPC	22	BDT-4-S-15-8BPC	32	PBS1
3	BDT-4-S-10-14BPC	13	BDT-4-S-15-10BPC	23	EB-08122010 W	33	PBS2
4	BDT-4-S-10-16BPC	14	BDT-4-S-15-10BPC_FD	24	SSAL8-02-1BPCMS S	34	
5	BDT-4-S-10-18BPC**	15	BDT-4-S-15-12BPC	25	SSAL8-02-1BPCMSD	35	
6	BDT-4-S-10-2BPC	16	BDT-4-S-15-14BPC	26	BDT-4-S-15-10BPCMS	36	
7	BDT-4-S-10-4BPC	17	BDT-4-S-15-16BPC	27	BDT-4-S-15-10BPCMSD	37	
8	BDT-4-S-10-6BPC	18	BDT-4-S-15-18BPC**	28	EB-08122010MS W	38	
9	BDT-4-S-10-8BPC	19	BDT-4-S-15-2BPC	29	EB-08122010MSD	39	
10	SSAL8-02-10BPC**	20	BDT-4-S-15-4BPC	30		40	

Notes: _____

LDC #: 24449B4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: V

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. 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.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike 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 +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 2444984

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-23		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC:24-29		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 24449B4

Page: 1 of 1
Reviewer: QR
2nd Reviewer:

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-12

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.151													

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 13-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.0464													

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 8-12

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn			1.45	0.725										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24449B4

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A Were field blanks identified in this SDG?

(Y) N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg

Sampling date: 8/13/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 1-9, 13-22

Analyte	Blank ID	Sample Identification										
	EB-08132010	Action Level	No Qualifiers									
Mn	2.5											

Sampling date: 8/12/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 10-12

Analyte	Blank ID	Sample Identification										
	23	Action Level	No Qualifiers									
Mn	1.0											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 24449B4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 13	Concentration (mg/Kg) 14	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.9	3.8	3			
Manganese	690	760	10			

V:\FIELD DUPLICATES\FD_inorganic\24449B4.wpd

LDC #: 24449B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Mn	40.9	40.0	102	102	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV (23:59)	ICP/MS (Continuing calibration)	As	50.4	50	101	101	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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 #: 24449B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (~~units~~) ug/L	True / D / SDR (~~units~~) ug/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Mn	101 ug/L	100 ug/L	101	101	Y
LCS	Laboratory control sample	As	18.2	20	91	91	
24	Matrix spike	↓	(SSR-SR) 17	19.1	89.	89	
24/25	Duplicate	Mn	14500	14200	2	2	
11	ICP serial dilution	Mn	14000	14300	2	2	

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 #: 24449B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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 and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Mn were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)(5)\left(\frac{781.2\mu g/L}{1000}\right)}{(1.128)(0.909)} = 383.7\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	18	As	6.0	6.0	Y
		Mn	380	380	↓

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 13 through August 16, 2010
LDC Report Date:	December 10, 2010
Matrix:	Soil/Water
Parameters:	Arsenic and Manganese
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6415-1

Sample Identification

EB-08162010
EB-08132010
BDT-4-N-15-2BPC
BDT-4-N-15-2BPC_FD
BDT-4-N-15-4BPC
BDT-4-N-15-6BPC
BDT-4-S-20-2BPC
BDT-4-S-20-4BPC
BDT-4-S-20-6BPC
BDT-4-S-20-8BPC
BDT-4-S-20-10BPC
BDT-4-S-20-12BPC
BDT-4-S-20-14BPC
BDT-4-S-20-16BPC
BDT-4-S-20-18BPC**
BDT-4-S-20-8BPC_FD
BDT-4-N-10-10BPC
BDT-4-N-10-12BPC
BDT-4-N-10-14BPC
BDT-4-N-10-14BPC_FD
BDT-4-N-10-16BPC
BDT-4-N-10-18BPC**
BDT-4-N-10-2BPC
BDT-4-N-10-4BPC
BDT-4-N-10-6BPC
BDT-4-N-10-8BPC
EB-08162010MS
EB-08162010MSD
BDT-4-N-10-2BPCMS
BDT-4-N-10-2BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 26 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020 for Arsenic and Manganese.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic or manganese contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.0641 mg/Kg	BDT-4-N-15-2BPC BDT-4-N-15-2BPC_FD BDT-4-N-15-4BPC BDT-4-N-15-6BPC BDT-4-S-20-2BPC BDT-4-S-20-4BPC BDT-4-S-20-6BPC BDT-4-S-20-8BPC BDT-4-S-20-10BPC BDT-4-S-20-12BPC BDT-4-S-20-14BPC BDT-4-S-20-16BPC BDT-4-S-20-18BPC** BDT-4-S-20-8BPC_FD BDT-4-N-10-10BPC BDT-4-N-10-12BPC BDT-4-N-10-14BPC BDT-4-N-10-14BPC_FD BDT-4-N-10-16BPC BDT-4-N-10-2BPC
PB (prep blank)	Manganese	0.0738 mg/Kg	BDT-4-N-10-18BPC** BDT-4-N-10-4BPC BDT-4-N-10-6BPC BDT-4-N-10-8BPC

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

Samples EB-08162010 and EB-08132010 were identified as equipment blanks. No arsenic or manganese contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-08132010	8/13/10	Manganese	2.5 ug/L	BDT-4-S-20-2BPC BDT-4-S-20-4BPC BDT-4-S-20-6BPC BDT-4-S-20-8BPC BDT-4-S-20-10BPC BDT-4-S-20-12BPC BDT-4-S-20-14BPC BDT-4-S-20-16BPC BDT-4-S-20-18BPC** BDT-4-S-20-8BPC_FD
EB-08162010	8/16/10	Manganese	2.8 ug/L	BDT-4-N-15-2BPC BDT-4-N-15-2BPC_FD BDT-4-N-15-4BPC BDT-4-N-15-6BPC BDT-4-N-10-10BPC BDT-4-N-10-12BPC BDT-4-N-10-14BPC BDT-4-N-10-14BPC_FD BDT-4-N-10-16BPC BDT-4-N-10-18BPC** BDT-4-N-10-2BPC BDT-4-N-10-4BPC BDT-4-N-10-6BPC BDT-4-N-10-8BPC

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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 280-6415-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-N-15-2BPC and BDT-4-N-15-2BPC_FD, samples BDT-4-S-20-8BPC and BDT-4-S-20-8BPC_FD, and samples BDT-4-N-10-14BPC and BDT-4-N-10-14BPC_FD were identified as field duplicates. No arsenic and manganese were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-15-2BPC	BDT-4-N-15-2BPC_FD				
Arsenic	3.0	2.9	3 (≤50)	-	-	-
Manganese	390	430	10 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-20-8BPC	BDT-4-S-20-8BPC_FD				
Arsenic	3.3	3.2	3 (≤50)	-	-	-
Manganese	520	330	45 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-10-14BPC	BDT-4-N-10-14BPC_FD				
Arsenic	4.1	4.0	2 (≤50)	-	-	-
Manganese	350	420	18 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese - Data Qualification Summary - SDG 280-6415-1

SDG	Sample	Analyte	Flag	A or P	Reason
280-6415-1	EB-08162010 EB-08132010 BDT-4-N-15-2BPC BDT-4-N-15-2BPC_FD BDT-4-N-15-4BPC BDT-4-N-15-6BPC BDT-4-S-20-2BPC BDT-4-S-20-4BPC BDT-4-S-20-6BPC BDT-4-S-20-8BPC BDT-4-S-20-10BPC BDT-4-S-20-12BPC BDT-4-S-20-14BPC BDT-4-S-20-16BPC BDT-4-S-20-18BPC** BDT-4-S-20-8BPC_FD BDT-4-N-10-10BPC BDT-4-N-10-12BPC BDT-4-N-10-14BPC BDT-4-N-10-14BPC_FD BDT-4-N-10-16BPC BDT-4-N-10-18BPC** BDT-4-N-10-2BPC BDT-4-N-10-4BPC BDT-4-N-10-6BPC BDT-4-N-10-8BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese - Laboratory Blank Data Qualification Summary - SDG 280-6415-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic and Manganese – Equipment Blank Data Qualification Summary - SDG 280-6415-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449C4
SDG #: 280-6415-1
Laboratory: Test America

Date: 12-1-10
Page: 1 of 1
Reviewer: SC
2nd Reviewer: MC

METHOD: As & Mn (EPA SW 846 Method 6020)

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: 8/13-16/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	~~LCS/D~~ or LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(3,4), (10,16), (19,20)
XV	Field Blanks	SW	EB=1, 2

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	EB-08162010 W	11	BDT-4-S-20-10BPC S	21	BDT-4-N-10-16BPC S	31	PBW
2	EB-08132010	12	BDT-4-S-20-12BPC	22	BDT-4-N-10-18BPC**	32	PBS1
3	BDT-4-N-15-2BPC S	13	BDT-4-S-20-14BPC	23	BDT-4-N-10-2BPC	33	PBS2
4	BDT-4-N-15-2BPC_FD	14	BDT-4-S-20-16BPC	24	BDT-4-N-10-4BPC	34	
5	BDT-4-N-15-4BPC	15	BDT-4-S-20-18BPC**	25	BDT-4-N-10-6BPC	35	
6	BDT-4-N-15-6BPC	16	BDT-4-S-20-8BPC_FD	26	BDT-4-N-10-8BPC	36	
7	BDT-4-S-20-2BPC	17	BDT-4-N-10-10BPC	27	EB-08162010MS W	37	
8	BDT-4-S-20-4BPC	18	BDT-4-N-10-12BPC	28	EB-08162010MSD	38	
9	BDT-4-S-20-6BPC	19	BDT-4-N-10-14BPC	29	BDT-4-N-10-2BPCMS S	39	
10	BDT-4-S-20-8BPC	20	BDT-4-N-10-14BPC_FD	30	BDT-4-N-10-2BPCMSD	40	

Notes: _____

LDC #: 24494

VALIDATION FINDINGS CHECKLIST

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

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. 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.	✓	~~✓~~ CR		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike 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 +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies haye duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓	✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓	✓		
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-26		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC: 27-30		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 24449C4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 3-21, 23

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.0641													

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 22, 24-26

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.0738													

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24449C4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: CR

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg

Sampling date: 8/13/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 7-16

Analyte	Blank ID	Sample Identification										
	2	Action Level	No Qualifiers									
Mn	2.5											

Sampling date: 8/16/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3-6, 17-26

Analyte	Blank ID	Sample Identification										
	1	Action Level	No Qualifiers									
Mn	2.8											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 24449C4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: SV
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6020/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 3	4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.0	2.9	3			
Manganese	390	430	10			

V:\FIELD DUPLICATES\FD_inorganic\24449C4.wpd

Compound	Concentration (mg/Kg) ~~15~~ 10	16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.3	3.2	3			
Manganese	520	330	45			

Compound	Concentration (mg/Kg) 19	20	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	4.1	4.0	2			
Manganese	350	420	18			

LDC #: 24449C4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	As	40.5	40.0	101	101	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Mn	49.8	50.0	100	100	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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 #: 29449C4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: SR
2nd Reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units) mg/kg	True / D / SDR (units) mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	99.6 ug/L	100 ug/L	99.6	99.6	Y
LCS	Laboratory control sample	As	19.2	20	96	96	
29	Matrix spike	↓	(SSR-SR) 16.3	17.8	92	91	
29/30	Duplicate	Mn	480	494	3	4	
	ICP serial dilution	↓	417	390	7	7	

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 #: 24449C4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: AR
2nd reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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 and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)(5)\left(\frac{10.74\mu g}{1000}\right)}{(1.07g)(0.896)} = 5.6 mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	22	As	5.6	5.6	Y
		Mn	260	260	Y

Note: _____

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:	December 2, 2010
Matrix:	Soil/Water
Parameters:	Chlorate and Perchlorate
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6290-1

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

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 and EPA Method 314.0 for Perchlorate.

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	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
Chlorate and Perchlorate - Data Qualification Summary - SDG 280-6290-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6290-1	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
Chlorate and Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorate and Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-6290-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24449A6
SDG #: 280-6290-1
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)

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	11	SSAJ3-07-1BPC	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	25		35	
6	SSAJ3-05-1BPC	16	EB-08102010	26		36	
7	SSAJ3-05-5BPC	17	SSAJ3-05-12BPCMS	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: CR
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 anaylzed 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?			✓	

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**
		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: W

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 = Found X 100 / 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. (µg/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(ug/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 #: 24496A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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 = Found / True x 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 = |S-D| / (S+D)/2 x 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 #: 24449A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [signature]

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:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 12, 2010
LDC Report Date:	December 2, 2010
Matrix:	Water
Parameters:	Perchlorate
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6385-1

Sample Identification

EB-08122010

Introduction

This data review covers one water sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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.

Raw data were not reviewed for this SDG. The review was 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(a). Initial Calibration

All criteria for the initial calibration of each method were met.

II(b). Calibration

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

Sample EB-08122010 was identified as an equipment blank. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6385-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

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
Perchlorate - Data Qualification Summary - SDG 280-6385-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6385-1	EB-08122010	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-6385-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24449B6
SDG #: 280-6385-1
Laboratory: Test America

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

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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: 8/12/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	↓
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	ND	EB=1

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: water

1	EB-08122010	11	PBW	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: