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

November 3, 2010

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on October 4, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24140:

SDG #	Fraction
280-6956-1, 280-6983-1, 280-7103-1 280-7117-1, 280-7183-1, 280-7229-1 280-7342-1, 280-7344-1, 280-7047-1	Volatiles, Semivolatiles, Chlorinated Pesticides, Metals, Perchlorate

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

EDD Stage 2B/4

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

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260B)		SVOA (8270C)		Pest. (8081A)		As (6020)		Co (6020)		Pb (6020)		Mn (6020)		Mg (6020)		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	W	S
A	280-6956-1	10/04/10	11/11/10	-	-	1	21	0	19	1	6	-	-	0	19	-	-	-	-	-	-														
A	280-6956-1	10/04/10	11/11/10	-	-	0	4	0	3	0	1	-	-	0	3	-	-	-	-	-	-														
B	280-6983-1	10/04/10	11/11/10	-	-	1	13	-	-	0	5	-	-	-	-	-	-	-	-	-	-														
B	280-6983-1	10/04/10	11/11/10	-	-	0	2	-	-	0	1	-	-	-	-	-	-	-	-	-	-														
C	280-7103-1	10/04/10	11/11/10	-	-	1	23	0	3	2	29	-	-	0	3	1	9	0	6	1	16														
C	280-7103-1	10/04/10	11/11/10	-	-	0	3	0	1	0	3	-	-	0	1	0	1	0	1	0	2														
D	280-7117-1	10/04/10	11/11/10	1	15	0	8	-	-	0	8	0	8	0	8	0	8	-	-	-	-														
D	280-7117-1	10/04/10	11/11/10	0	1	0	0	-	-	0	0	0	0	0	0	0	0	-	-	-	-														
E	280-7183-1	10/04/10	11/11/10	-	-	0	13	-	-	1	14	-	-	-	-	1	11	-	-	-	-														
E	280-7183-1	10/04/10	11/11/10	-	-	0	2	-	-	0	3	-	-	-	-	0	2	-	-	-	-														
F	280-7229-1	10/04/10	11/11/10	0	5	0	3	-	-	0	3	0	3	0	3	0	3	-	-	-	-														
F	280-7229-1	10/04/10	11/11/10	0	1	0	0	-	-	0	0	0	0	0	0	0	0	-	-	-	-														
G	280-7342-1	10/04/10	11/11/10	-	-	0	5	-	-	0	5	0	5	0	5	0	5	-	-	-	-														
G	280-7342-1	10/04/10	11/11/10	-	-	0	1	-	-	0	1	0	1	0	1	0	1	-	-	-	-														
H	280-7344-1	10/04/10	11/11/10	-	-	1	5	-	-	0	3	-	-	-	-	-	-	-	-	-	-														
H	280-7344-1	10/04/10	11/11/10	-	-	0	1	-	-	0	0	-	-	-	-	-	-	-	-	-	-														
I	280-7047-1	10/04/10	11/11/10	-	-	1	9	1	4	-	-	-	-	-	-	-	-	-	-	-	-														
I	280-7047-1	10/04/10	11/11/10	-	-	0	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-														
Total	T/LR			1	22	5	114	1	30	4	82	0	17	0	43	2	40	0	7	1	18	0	0	0	0	0	0	0	0	0	0	0	0	0	387

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

EDD CHECKLIST

LDC #: 24140
SDG #: 280-6956-1, 280-6983-1, 280-7103-1, 280-7117-1, 280-7183-1
280-7229-1, 280-7342-1, 280-7344-1, 280-7047-1

Reviewer: JE
2nd Reviewer: BC

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?		X		
If yes, were they corrected or documented for the client?			X	See EDD_discrepancy_ form_LDC24140_110210.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 7, 2010

LDC Report Date: October 22, 2010

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7117-1

Sample Identification

SSAN8-06-0BPC
SSAN8-06-0.5BPC
SSAN8-05-0BPC
SSAN8-05-0.5BPC
SSAN7-06-0BPC
SSAN7-06-0.5BPC
SSAN7-07-0BPC
SSAN7-07-0.5BPC
SSAN8-03-0BPC
SSAN8-03-0.5BPC
SSAN8-04-0BPC
SSAN8-04-0.5BPC**
SSAN8-07-0BPC
SSAN8-07-0.5BPC
SSAN8-07-0BPC_FD
SSAN8-04-0.5BPC_FD
TB-09072010_1
SSAN7-06-0BPCMS
SSAN7-06-0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 18 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/10/10	tert-Butyl alcohol	0.0361 (≥0.05)	SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD MB 280-31921/6	J (all detects) UJ (all non-detects)	A
8/31/10	tert-Butyl alcohol	0.0243 (≥0.05)	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC SSAN7-06-0BPCMS SSAN7-06-0BPCMSD MB 280-30996/3-A	J (all detects) UJ (all non-detects)	A
9/14/10	tert-Butyl alcohol	0.0058 (≥0.05)	TB-09072010_1 MB 280-31772/6	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
9/13/10	tert-Butyl alcohol	0.0373 (≥0.05)	SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD MB 280-31921/6	J (all detects) UJ (all non-detects)	A
9/11/10	tert-Butyl alcohol	0.0249 (≥0.05)	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC SSAN7-06-0BPCMS SSAN7-06-0BPCMSD MB 280-30996/3-A	J (all detects) UJ (all non-detects)	A
9/15/10	tert-Butyl alcohol	0.0053 (≥0.05)	TB-09072010_1 MB 280-31772/6	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
MB 280-30996/3-A	9/11/10	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Methylene chloride Naphthalene	1.70 ug/Kg 1.35 ug/Kg 1.35 ug/Kg 1.86 ug/Kg 1.62 ug/Kg	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280-31921/6	9/11/10	Methylene chloride	1.10 ug/Kg	SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD

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
SSAN8-06-0BPC	Methylene chloride	1.1 ug/Kg	1.1U ug/Kg
SSAN8-06-0.5BPC	Methylene chloride	1.2 ug/Kg	1.2U ug/Kg
SSAN8-05-0BPC	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAN8-05-0.5BPC	Methylene chloride	1.4 ug/Kg	1.4U ug/Kg
SSAN7-06-0BPC	Hexachlorobutadiene Methylene chloride	0.45 ug/Kg 0.94 ug/Kg	0.45U ug/Kg 0.94U ug/Kg
SSAN7-06-0.5BPC	Methylene chloride	1.9 ug/Kg	1.9U ug/Kg
SSAN7-07-0BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAN7-07-0.5BPC	Methylene chloride	1.3 ug/Kg	1.3U ug/Kg
SSAN8-03-0BPC	Methylene chloride	0.71 ug/Kg	0.71U ug/Kg
SSAN8-03-0.5BPC	Methylene chloride	0.52 ug/Kg	0.52U ug/Kg
SSAN8-04-0BPC	Methylene chloride	0.86 ug/Kg	0.86U ug/Kg
SSAN8-04-0.5BPC**	Methylene chloride	0.67 ug/Kg	0.67U ug/Kg
SSAN8-07-0BPC	Methylene chloride	0.44 ug/Kg	0.44U ug/Kg
SSAN8-07-0.5BPC	Methylene chloride	0.50 ug/Kg	0.50U ug/Kg
SSAN8-07-0BPC_FD	Methylene chloride	0.53 ug/Kg	0.53U ug/Kg
SSAN8-04-0.5BPC_FD	Methylene chloride	1.2 ug/Kg	1.2U ug/Kg

Sample TB-09072010_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-09072010_1	9/7/10	Acetone Methylene chloride	2.3 ug/L 0.52 ug/L	All soil samples in SDG 280-7117-1

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SSAN8-05-0BPC	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAN7-06-0BPC	Methylene chloride	0.94 ug/Kg	0.94U ug/Kg
SSAN8-03-0BPC	Methylene chloride	0.71 ug/Kg	0.71U ug/Kg
SSAN8-03-0.5BPC	Methylene chloride	0.52 ug/Kg	0.52U ug/Kg
SSAN8-04-0BPC	Methylene chloride	0.86 ug/Kg	0.86U ug/Kg
SSAN8-04-0.5BPC**	Acetone Methylene chloride	2.7 ug/Kg 0.67 ug/Kg	2.7U ug/Kg 0.67U ug/Kg
SSAN8-07-0BPC	Methylene chloride	0.44 ug/Kg	0.44U ug/Kg
SSAN8-07-0.5BPC	Methylene chloride	0.50 ug/Kg	0.50U ug/Kg
SSAN8-07-0BPC_FD	Methylene chloride	0.53 ug/Kg	0.53U 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 percent recoveries (%R) and relative percent difference (RPD) were not within QC limits for several compounds, the MS, MSD, or 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.

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 280-7117-1	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 SSAN8-07-0BPC and SSAN8-07-0BPC_FD and samples SSAN8-04-0.5BPC and SSAN8-04-0.5BPC_FD were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN8-04-0.5BPC	SSAN8-04-0.5BPC_FD				
Acetone	2.7	14U	-	11.3 (≤14)	-	-
Methylene chloride	0.67	1.2	-	0.53 (≤3.6)	-	-
1,1Dichloroethene	2.5U	1.2	-	1.3 (≤2.5)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN8-07-0BPC	SSAN8-07-0BPC_FD				
Methylene chloride	0.44	0.53	-	0.09 (≤3.0)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG 280-7117-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7117-1	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD TB-09072010_1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
280-7117-1	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD TB-09072010_1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
280-7117-1	SSAN8-06-0BPC SSAN8-06-0.5BPC SSAN8-05-0BPC SSAN8-05-0.5BPC SSAN7-06-0BPC SSAN7-06-0.5BPC SSAN7-07-0BPC SSAN7-07-0.5BPC SSAN8-03-0BPC SSAN8-03-0.5BPC SSAN8-04-0BPC SSAN8-04-0.5BPC** SSAN8-07-0BPC SSAN8-07-0.5BPC SSAN8-07-0BPC_FD SSAN8-04-0.5BPC_FD TB-09072010_1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-7117-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7117-1	SSAN8-06-0BPC	Methylene chloride	1.1U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7117-1	SSAN8-06-0.5BPC	Methylene chloride	1.2U ug/Kg	A	bl
280-7117-1	SSAN8-05-0BPC	Methylene chloride	1.0U ug/Kg	A	bl
280-7117-1	SSAN8-05-0.5BPC	Methylene chloride	1.4U ug/Kg	A	bl
280-7117-1	SSAN7-06-0BPC	Hexachlorobutadiene Methylene chloride	0.45U ug/Kg 0.94U ug/Kg	A	bl
280-7117-1	SSAN7-06-0.5BPC	Methylene chloride	1.9U ug/Kg	A	bl
280-7117-1	SSAN7-07-0BPC	Methylene chloride	1.3U ug/Kg	A	bl
280-7117-1	SSAN7-07-0.5BPC	Methylene chloride	1.3U ug/Kg	A	bl
280-7117-1	SSAN8-03-0BPC	Methylene chloride	0.71U ug/Kg	A	bl
280-7117-1	SSAN8-03-0.5BPC	Methylene chloride	0.52U ug/Kg	A	bl
280-7117-1	SSAN8-04-0BPC	Methylene chloride	0.86U ug/Kg	A	bl
280-7117-1	SSAN8-04-0.5BPC**	Methylene chloride	0.67U ug/Kg	A	bl
280-7117-1	SSAN8-07-0BPC	Methylene chloride	0.44U ug/Kg	A	bl
280-7117-1	SSAN8-07-0.5BPC	Methylene chloride	0.50U ug/Kg	A	bl
280-7117-1	SSAN8-07-0BPC_FD	Methylene chloride	0.53U ug/Kg	A	bl
280-7117-1	SSAN8-04-0.5BPC_FD	Methylene chloride	1.2U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG 280-7117-1

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
280-7117-1	SSAN8-05-0BPC	Methylene chloride	1.0U ug/Kg	A	bt
280-7117-1	SSAN7-06-0BPC	Methylene chloride	0.94U ug/Kg	A	bt
280-7117-1	SSAN8-03-0BPC	Methylene chloride	0.71U ug/Kg	A	bt
280-7117-1	SSAN8-03-0.5BPC	Methylene chloride	0.52U ug/Kg	A	bt
280-7117-1	SSAN8-04-0BPC	Methylene chloride	0.86U ug/Kg	A	bt
280-7117-1	SSAN8-04-0.5BPC**	Acetone Methylene chloride	2.7U ug/Kg 0.67U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
280-7117-1	SSAN8-07-0BPC	Methylene chloride	0.44U ug/Kg	A	bt
280-7117-1	SSAN8-07-0.5BPC	Methylene chloride	0.50U ug/Kg	A	bt
280-7117-1	SSAN8-07-0BPC_FD	Methylene chloride	0.53U ug/Kg	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140D1
SDG #: 280-7117-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JR
2nd Reviewer: [signature]

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	A	Sampling dates: 9/07/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD ✓
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
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	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 = 12, 16 D_2 = 13, 15
XVII.	Field blanks	SW	TB = 17

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	1	SSAN8-06-0BPC	S	11	✓	SSAN8-04-0BPC	S	21	+ 1	MB 280-30996/3-A	31	
2	1	SSAN8-06-0.5BPC		12	✓	SSAN8-04-0.5BPC**		22	+ ✓	MB 280-31921/6	32	
3	1	SSAN8-05-0BPC		13	✓	SSAN8-07-0BPC		23	− ✓	MB 280-31772/6	33	
4	1	SSAN8-05-0.5BPC		14	✓	SSAN8-07-0.5BPC		24			34	
5	1	SSAN7-06-0BPC		15	✓	SSAN8-07-0BPC_FD		25			35	
6	1	SSAN7-06-0.5BPC		16	✓	SSAN8-04-0.5BPC_FD		26			36	
7	1	SSAN7-07-0BPC		17	3	TB-09072010_1	W	27			37	
8	1	SSAN7-07-0.5BPC		18	1	SSAN7-06-0BPCMS	S	28			38	
9	✓	SSAN8-03-0BPC		19	1	SSAN7-06-0BPCMSD		29			39	
10	✓	SSAN8-03-0.5BPC		20				30			40	

LDC #: 24140 D1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: W

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 #: 24140 D1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [signature]

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 #: 24140D1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: SW
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 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? $r^2 \geq 0.99$
(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
	9/10/10	ICAL-MSV G	ZZZ		0.0361	9-16, MB 280-31921/6	J/MS/A (C)
	8/31/10	ICAL-MSV J	ZZZ		0.0243	1-8, 18, 19, MB 280-30996/3-A	
	9/14/10	ICAL-MSV MS1	ZZZ		0.0058	17, MB 280-31772/6	

LDC #: 24140 D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JV6
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 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
	9/12/10	G8551	ZZZ		0.0373	9-16, MB 280-31921/6	J /NJ /A (C)
	9/11/10	V0866	ZZZ		0.0249	1-8, 18, 19, MB 280-30996/3-A	
	9/15/10	MS3423	ZZZ		0.0053	17, MB 280-31772/6	

CONCAL.wpd

LDC #: 24140 D1

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JG
2nd Reviewer: L

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: 9/11/10
Conc. units: ug/Kg
Associated Samples: 1-8 (bl)

Compound	Blank ID	Sample Identification								
MB	280-30996/3-A	1	2	3	4	5	6	7	8	
~~Methylene chloride~~ NNN	1.70									
~~Acetone~~ KKK	1.35									
LLL	1.35					0.45 /u				
E	1.86	1.1 /u	1.2 /u	1.0 /u	1.4 /u	0.94 /u	1.9 /u	1.2 /u	1.3 /u	
MMM	1.62									
CRQL										

Blank analysis date: 9/15/10
Conc. units: ug/Kg
Associated Samples: 9-16 (bl)

Compound	Blank ID	Sample Identification								
MB	280-31921/6	9	10	11	12	13	14	15	16	
Methylene chloride E	1.10	0.71 /u	0.52 /u	0.86 /u	0.67 /u	0.44 /u	0.50 /u	0.53 /u	1.2 /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 #: 24140 b1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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: 9/07/10
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: All S (bt)

Compound	Blank ID	Sample Identification									
	17	3	5	9	10	11	12	13	14	15
2X / 1.6 Methylene chloride F	2.3						2.7 /u			
1.04 ~~Acetone~~ E	0.52	1.0 /u	0.94 /u	0.71 /u	0.52 /u	0.86 /u	0.67 /u	0.44 /u	0.50 /u	0.53 /u
Chloroform										
			(All others either ND or > 2x TB)							

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

Compound	Blank ID	Sample Identification									
Methylene chloride											
Acetone											
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 #: 24140 D1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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
	18/19	several compounds	outside	limits for		5	NO qual
		%R and %RPD	( )	( )			(either MS, MSD or LCS, LCSD in)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

	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%

LDC#: 24140D1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SVG
2nd Reviewer:

METHOD: GC/MS VOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	12	16				
Acetone	2.7	14U		11.3	≤14	
Methylene chloride	0.67	1.2		0.53	≤3.6	
1,1Dichloroethene	2.5U	1.2		1.3	≤2.5	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	13	15				
Methylene chloride	0.44	0.53		0.09	≤3.0	

V:\FIELD DUPLICATES\24140D1.wpd

LDC #: 24140 B9

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	9/10/2010	Acetone (IS1)	0.0870	0.0870	0.0903	0.0904	10.9	10.94
2	GC MSV G		Ethylbenzene (IS2)	1.1770	1.1770	1.1794	1.1794	7.1	7.09
3			1,1,2,2-TCA (IS3)	1.1603	1.1603	1.1935	1.1935	8.8	8.80
4									
5									
6									

Conc IS/Cpd	Area cpd	Area IS
50/200	730995	2100843
50/50	690944	587055
50/50	969526	835570

Conc	Acetone	Ethylbenzene	1,1,2,2-TCA
2		1.2944	1.3958
5	0.1084	1.1171	1.2460
10	0.0942	1.2136	1.1775
20	0.0874	1.2646	1.1938
50	**0.0870**	**1.1770**	**1.1603**
100	0.0843	1.0630	1.0877
200	0.0808	1.1264	1.0937
X =	0.0904	1.1794	1.1935
S =	0.0099	0.0836	0.1050

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 # 24140 D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

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	G8551	9/13/2010	Acetone	(IS1)	0.090	0.084	0.084	6.5	6.5
	GC MSV G		Ethylbenzene	(IS2)	1.179	1.228	1.228	4.1	4.1
			1,1,2,2-TCA	(IS3)	1.194	1.147	1.147	3.9	3.9
2									
3									

	CCV1		CCV2		CCV3	
Cis/Cx	Ax	Ais	Ax	Ais	Ax	Ais
50/50	795697	2355637				
50/50	840169	684189				
50/50	1136121	990626				

LDC #: 24140 D1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: #12

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	55	57.62	105	105	0
Bromofluorobenzene		54.8	100	100	
1,2-Dichloroethane-d4		54.8	100	100	
Dibromofluoromethane		55.4	101	101	

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 #: 24140 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

MS/MSD sample: 18 /19

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	168	127	0	122	91	73	73	72	72	29	29
Trichloroethene	↓	↓	↓	117	80.7	70	70	64	64	37	37
Benzene				123	88	73	73	70	70	33	33
Toluene				120	80.5	72	72	64	64	40	39
Chlorobenzene				117	72.6	70	70	57	57	47	47

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 #: 24140 D1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JM
2nd Reviewer: [illegible]

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

LCS ID: LCS D280-31921/4,5

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	Recalculated
1,1-Dichloroethene	50	50	52.5	49.4	105	105	99	99	6	6
Trichloroethene			51.9	49.8	104	104	100	100	4	4
Benzene			48.4	47.8	97	97	96	96	1	1
Toluene			50.0	48.5	100	100	97	97	3	3
Chlorobenzene			47.5	46.6	95	95	93	93	✓	✓

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 #: 24140 b1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
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. #12 . F :

Conc. = $\frac{(19834)(50)(5\,ml)}{(2045270)(.0903)(10.3778)(0.953)}$

= 2.7 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:	September 8, 2010
LDC Report Date:	October 22, 2010
Matrix:	Soil
Parameters:	Volatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7229-1

Sample Identification

SSAO8-04-0BPC
SSAO8-04-0.5BPC
SSAO8-07-0BPC
SSAO8-07-0.5BPC
SSAO7-04-0BPC
SSAO7-04-0.5BPC**

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil samples 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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.

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
8/31/10	tert-Butyl alcohol	0.0243 (≥0.05)	All samples in SDG 280-7229-1	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
9/15/10	tert-Butyl alcohol	0.0287 (≥0.05)	All samples in SDG 280-7229-1	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
MB 280-31540/3-A	9/15/10	Hexachlorobutadiene Methylene chloride Naphthalene	0.595 ug/Kg 1.74 ug/Kg 0.642 ug/Kg	All samples in SDG 280-7229-1

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
SSAO8-04-0BPC	Methylene chloride	1.0 ug/Kg	1.0U ug/Kg
SSAO8-04-0.5BPC	Methylene chloride	0.93 ug/Kg	0.93U ug/Kg
SSAO8-07-0BPC	Methylene chloride	0.94 ug/Kg	0.94U ug/Kg
SSAO8-07-0.5BPC	Methylene chloride	0.85 ug/Kg	0.85U ug/Kg
SSAO7-04-0BPC	Hexachlorobutadiene Methylene chloride	0.41 ug/Kg 0.84 ug/Kg	0.41U ug/Kg 0.84U ug/Kg
SSAO7-04-0.5BPC**	Methylene chloride	0.82 ug/Kg	0.82U ug/Kg

No field blanks were identified in this SDG.

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

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.

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 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 280-7229-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG 280-7229-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7229-1	SSAO8-04-0BPC SSAO8-04-0.5BPC SSAO8-07-0BPC SSAO8-07-0.5BPC SSAO7-04-0BPC SSAO7-04-0.5BPC**	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
280-7229-1	SSAO8-04-0BPC SSAO8-04-0.5BPC SSAO8-07-0BPC SSAO8-07-0.5BPC SSAO7-04-0BPC SSAO7-04-0.5BPC**	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
280-7229-1	SSAO8-04-0BPC SSAO8-04-0.5BPC SSAO8-07-0BPC SSAO8-07-0.5BPC SSAO7-04-0BPC SSAO7-04-0.5BPC**	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-7229-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7229-1	SSAO8-04-0BPC	Methylene chloride	1.0U ug/Kg	A	bl
280-7229-1	SSAO8-04-0.5BPC	Methylene chloride	0.93U ug/Kg	A	bl
280-7229-1	SSAO8-07-0BPC	Methylene chloride	0.94U ug/Kg	A	bl
280-7229-1	SSAO8-07-0.5BPC	Methylene chloride	0.85U ug/Kg	A	bl
280-7229-1	SSAO7-04-0BPC	Hexachlorobutadiene Methylene chloride	0.41U ug/Kg 0.84U ug/Kg	A	bl
280-7229-1	SSAO7-04-0.5BPC**	Methylene chloride	0.82U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG 280-7229-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140F1
SDG #: 280-7229-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JV
2nd Reviewer: V

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	A	Sampling dates: 9/08/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD
IV.	Continuing calibration/ICV	SW	ccv/icv ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
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	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	N	
XVII.	Field blanks	N	

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: All Soils ** Indicates sample underwent Stage 4 validation

1	SSAO8-04-0BPC	11	MB 280-31540/3-A	21		31	
2	SSAO8-04-0.5BPC	12		22		32	
3	SSAO8-07-0BPC	13		23		33	
4	SSAO8-07-0.5BPC	14		24		34	
5	SSAO7-04-0BPC	15		25		35	
6	SSAO7-04-0.5BPC**	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 24140 F1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: V

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?	NA	✓		
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 #: 24140 #1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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 #: 24140F1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: NV
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 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? NA
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
	8/31/10	ICAL-MSVJ	ZZZ		0.0243	All	J/NJ/A (c)

LDC #: 24140F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: L

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
	9/15/10	J0965	ZZZ		0.0287	All	J/UJ/A (C)

LDC #: 24140 #1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: JVB
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: 9/15/10

Conc. units: ug/kg Associated Samples: All (bl)

Compound	Blank ID	Sample Identification								
MB	280-31540/3-A	1	2	3	4	5	6			
~~Methylene chloride~~ LLL	0.595					0.41/u				
~~Acetone~~ E	1.7	1.0/u	0.93/u	0.94/u	0.85/u	0.84/u	0.82/u			
MMM	0.67									
CRQL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
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 #: 24140 F1

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	Methylene chloride (IS1)	0.2426	0.2426	0.2516	0.2516	12.5	12.53
2	GC MSV J		Ethylbenzene (IS2)	1.3880	1.3880	1.3604	1.3604	6.2	6.17
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
50/50	609464	2512331
50/50	869567	626482
50/50	1086352	1063598

Conc	MeCl2	Ethylbenzene	1,1,2,2-TCA
2		1.4889	1.0270
5	0.3098	1.4234	1.0063
10	0.2607	1.3334	0.9683
20	0.2452	1.3421	0.9462
50	**0.2426**	**1.3880**	**1.0214**
100	0.2279	1.3234	1.0029
200	0.2231	1.2238	1.0401
X =	0.2516	1.3604	1.0017
S =	0.0315	0.0840	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 # 24140 F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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	J0965	9/15/2010	Methylene chloride (IS1)	0.252	0.242	0.242	3.8	3.8
	GC MSV J		Ethylbenzene (IS2)	1.360	1.332	1.332	2.1	2.1
			1,1,2,2-TCA (IS3)	1.002	0.950	0.950	5.1	5.1
2								
3								

	CCV1		CCV2		CCV3	
Cis/Cx	Ax	Ais	Ax	Ais	Ax	Ais
50/50	723062	2988082				
50/50	1094410	821735				
50/50	1468876	1545395				

LDC #: 24140A1

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

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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: #6

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	48.1	96	96	0
Bromofluorobenzene		53.6	107	107	
1,2-Dichloroethane-d4		45	90	90	
Dibromofluoromethane	↓	51.4	103	103	↓

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 #: 24140 F1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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

LCS ID: LCS/D 280-31540/1,2-A

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	Recalculated
1,1-Dichloroethene	50.0	50.0	55.0	50.9	110	110	102	102	8	8
Trichloroethene			53.6	49.8	107	107	100	100	7	7
Benzene			53.5	49.9	107	107	100	100	7	7
Toluene			53.7	49.8	107	107	100		7	7
Chlorobenzene			50.5	46.8	101	101	94	94	8	8

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 #: 24140 F1

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. # 6 , E :

Conc. = $\frac{(21764)(50)(5\ ml)}{(3028981)(0.252)(9.297\ g)(0.933)}$

= 0.82 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 30, 2010

LDC Report Date: October 25, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6956-1

Sample Identification

BDT-1-S-15-10BPC
BDT-1-S-15-12BPC
BDT-1-S-15-14BPC**
BDT-1-S-15-2BPC
BDT-1-S-15-4BPC
BDT-1-S-15-6BPC
BDT-1-S-15-8BPC
BDT-1-S-15-2BPC_FD
SSAQ5-03-10BPC**
SSAQ5-03-1BPC
SSAQ5-03-5BPC
BDT-1-S-10-10BPC
BDT-1-S-10-12BPC
BDT-1-S-10-14BPC**
BDT-1-S-10-2BPC
BDT-1-S-10-4BPC
BDT-1-S-10-6BPC
BDT-1-S-10-8BPC
BDT-1-S-5-10BPC
BDT-1-S-5-12BPC
BDT-1-S-5-14BPC**
BDT-1-S-5-8BPC
BDT-1-S-5-2BPC
BDT-1-S-5-4BPC
BDT-1-S-5-6BPC
EB-08302010
SSAQ5-03-1BPCMS
SSAQ5-03-1BPCMSD
BDT-1-S-10-8BPCMS
BDT-1-S-10-8BPCMSD
BDT-1-S-5-14BPCMS
BDT-1-S-5-14BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 31 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 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 280-31028/1-A	9/12/10	Dimethylphthalate	429 ug/Kg	BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC BDT-1-S-10-10BPC
MB 280-30961/1-A	9/10/10	Dimethylphthalate	47.2 ug/Kg	BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC

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
BDT-1-S-15-14BPC**	Dimethylphthalate	57 ug/Kg	57U ug/Kg
BDT-1-S-15-2BPC	Dimethylphthalate	94 ug/Kg	94U ug/Kg
BDT-1-S-15-8BPC	Dimethylphthalate	89 ug/Kg	89U ug/Kg
BDT-1-S-15-2BPC_FD	Dimethylphthalate	120 ug/Kg	120U ug/Kg
SSAQ5-03-10BPC**	Dimethylphthalate	66 ug/Kg	66U ug/Kg
SSAQ5-03-1BPC	Dimethylphthalate	73 ug/Kg	73U ug/Kg
BDT-1-S-5-10BPC	Dimethylphthalate	91 ug/Kg	91U ug/Kg
BDT-1-S-5-14BPC**	Dimethylphthalate	110 ug/Kg	110U ug/Kg
BDT-1-S-5-8BPC	Dimethylphthalate	140 ug/Kg	140U ug/Kg
BDT-1-S-5-2BPC	Dimethylphthalate	130 ug/Kg	130U ug/Kg
BDT-1-S-5-6BPC	Dimethylphthalate	230 ug/Kg	230U ug/Kg

Sample EB-08032010 was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-08032010	8/30/10	Bis(2-ethyhexyl)phthalate	11 ug/L	SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC

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

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.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6956-1	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 BDT-1-S-15-2BPC and BDT-1-S-15-2BPC_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
	BDT-1-S-15-2BPC_FD	BDT-1-S-15-2BPC_FD				
Dimethylphthalate	94	120	-	26 (≤340)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6956-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6956-1	BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC EB-08302010	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 280-6956-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6956-1	BDT-1-S-15-14BPC**	Dimethylphthalate	57U ug/Kg	A	bl
280-6956-1	BDT-1-S-15-2BPC	Dimethylphthalate	94U ug/Kg	A	bl
280-6956-1	BDT-1-S-15-8BPC	Dimethylphthalate	89U ug/Kg	A	bl
280-6956-1	BDT-1-S-15-2BPC_FD	Dimethylphthalate	120U ug/Kg	A	bl
280-6956-1	SSAQ5-03-10BPC**	Dimethylphthalate	66U ug/Kg	A	bl
280-6956-1	SSAQ5-03-1BPC	Dimethylphthalate	73U ug/Kg	A	bl
280-6956-1	BDT-1-S-5-10BPC	Dimethylphthalate	91U ug/Kg	A	bl
280-6956-1	BDT-1-S-5-14BPC**	Dimethylphthalate	110U ug/Kg	A	bl
280-6956-1	BDT-1-S-5-8BPC	Dimethylphthalate	140U ug/Kg	A	bl
280-6956-1	BDT-1-S-5-2BPC	Dimethylphthalate	130U ug/Kg	A	bl
280-6956-1	BDT-1-S-5-6BPC	Dimethylphthalate	230U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6956-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140A2a
SDG #: 280-6956-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JM
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: 8/30/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
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	
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 = 4.8
XVII.	Field blanks	SW	EB = 26

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-1-S-15-10BPC	S	11	SSAQ5-03-5BPC	S	21	BDT-1-S-5-14BPC**	S	31	BDT-1-S-5-14BPCMS	S
2	BDT-1-S-15-12BPC		12	BDT-1-S-10-10BPC		22	BDT-1-S-5-8BPC		32	BDT-1-S-5-14BPCMSD	
3	BDT-1-S-15-14BPC**		13	BDT-1-S-10-12BPC		23	BDT-1-S-5-2BPC		33	MB 280-30961/1-A	
4	BDT-1-S-15-2BPC	D	14	BDT-1-S-10-14BPC**		24	BDT-1-S-5-4BPC		34	MB 280-31028/1-A	
5	BDT-1-S-15-4BPC		15	BDT-1-S-10-2BPC		25	BDT-1-S-5-6BPC		35	MB 280-30058/1-A	
6	BDT-1-S-15-6BPC		16	BDT-1-S-10-4BPC		26	EB-08302010	W	36		
7	BDT-1-S-15-8BPC		17	BDT-1-S-10-6BPC		27	SSAQ5-03-1BPCMS	S	37		
8	BDT-1-S-15-2BPC_FD	D	18	BDT-1-S-10-8BPC		28	SSAQ5-03-1BPCMSD		38		
9	SSAQ5-03-10BPC**		19	BDT-1-S-5-10BPC		29	BDT-1-S-10-8BPCMS		39		
10	SSAQ5-03-1BPC		20	BDT-1-S-5-12BPC		30	BDT-1-S-10-8BPCMSD		40		

LDC #: 24140 A2A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: V

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 duplicate				
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 #: 24140 A2A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: W

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/CRQL				
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.	✓			
XVI. 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 #: 24140 A 2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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.

(bl)

Blank extraction date: 9/12/10 **Blank analysis date:** 9/13/10
Conc. units: ug/kg Associated Samples: 1-12

Compound	Blank ID	Sample Identification								
MB	280-30961/1-A	3	4	7	8	9	10			
5x 2145 236 CC	429 477	57/U	94/U	89/U	120/U	66/U	73/U			

Blank extraction date: 9/10/10 **Blank analysis date:** 9/13/10
Conc. units: ug/kg Associated Samples: 13-25

(bl)

Compound	Blank ID	Sample Identification								
MB	280-30961/1-A	19	21	22	23	25				
5x 2145 236 CC	429	91/U	110/U	140/U	130/U	230/U				
		(All others		>5x MB)						

5x Phthalates
2x all others

LDC #: 24140 A2a
SDG #: Sc Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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

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: 8/30/10

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 9, 10, 11 / / ~~All~~ 5 (be)

Compound	Blank ID	Sample Identification								
5x	26									
55 EEE	11	(All results > 5x EB)								
CRQL										

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC#: 24140A2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: DV
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	4	8				
Dimethylphthalate	94	120		26	≤340	

V:\FIELD DUPLICATES\24140A2a.wpd

LDC #: 24140 A 2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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	9/13/2010	Phenol (IS1)	1.8397	1.8397	1.7733	1.7733	5.9	5.92
	MSS B		Naphthalene (IS2)	1.0767	1.0767	1.0396	1.0396	10.0	9.98
			Fluorene (IS3)	1.3777	1.3777	1.3051	1.3051	11.6	11.56
			Hexachlorobenzene (IS4)	0.2406	0.2406	0.2343	0.2343	6.0	6.03
			Bis(2-ethylhexyl)phthalate (IS5)	0.7243	0.7243	0.6681	0.6681	9.7	9.69
			Benzo(g,h,i)perylene (IS6)	1.1315	1.1315	1.0938	1.0938	3.8	3.80

onc IS/Cpd	Area cpd	Area IS
40/50	579802	252134
40/50	1338510	994488
40/50	983140	570870
40/50	290330	965177
40/50	963068	1063669
40/50	1493397	1055901

Conc	Phenol	Naphthalene	Fluorene	Hexachlorob	bis(2-eh)phtha	Benzo(g,h,i)per
4.00	1.8394	1.1419	1.4534	0.2371	0.5406	1.0227
10.00	1.8341	1.1290	1.4363	0.2472	0.6101	1.1141
20.00	1.8662	1.1384	1.4299	0.2521	0.6785	1.1201
50.00	**1.8397**	**1.0767**	**1.3777**	**0.2406**	**0.7243**	**1.1315**
80.00	1.8227	1.0555	1.3340	0.2401	0.7348	1.1412
120.00	1.7552	0.9806	1.2121	0.2281	0.7081	1.0957
160.00	1.6515	0.9246	1.1457	0.2180	0.6863	1.0744
200.00	1.5775	0.8701	1.0514	0.2113	0.6617	1.0506
X =	1.7733	1.0396	1.3051	0.2343	0.6681	1.0938
S =	0.1049	0.1037	0.1509	0.0141	0.0647	0.0415

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 #: 24140 Arq

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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	8/27/2010	1,4-Dioxane (IS1)	0.5926	0.5926	0.5795	0.5795	3.7	3.74
	MSS K		Naphthalene (IS2)	1.0571	1.0571	1.0015	1.0015	8.9	8.92
			Fluorene (IS3)	1.3180	1.3180	1.2421	1.2421	7.9	7.87
			Hexachlorobenzene (IS4)	0.2424	0.2424	0.2313	0.2313	6.1	6.04
			Bis(2-ethylhexyl)phthalate (IS5)	0.6574	0.6574	0.6075	0.6075	7.1	7.14
			Benzo(g,h,i)perylene (IS6)	1.1231	1.1231	1.0199	1.0199	7.5	7.53

)nc IS/Cpd	Area cpd	Area IS
40/50	127636	172314
40/50	884641	669515
40/50	648342	393544
40/50	200827	662745
40/50	624253	759660
40/50	1096793	781265

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Bis(2-eh)phtha	Benzo(g,h,i)per
4.00	0.5778	1.1018	1.3240		0.5199	0.9595
10.00	0.6003	1.0722	1.3327	0.2454	0.5982	1.0450
20.00	0.6103	1.0714	1.3075	0.2448	0.6428	1.0900
50.00	**0.5926**	**1.0571**	**1.3180**	**0.2424**	**0.6574**	**1.1231**
80.00	0.5842	1.0008	1.2564	0.2335	0.6408	1.0769
120.00	0.5678	0.9489	1.1901	0.2252	0.6113	1.0108
160.00	0.5547	0.8964	1.1248	0.2168	0.6051	0.9476
200.00	0.5485	0.8636	1.0833	0.2109	0.5841	0.9066
X =	0.5795	1.0015	1.2421	0.2313	0.6075	1.0199
S =	0.0217	0.0893	0.0977	0.0140	0.0434	0.0768

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 #_____

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: [signature]

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	K6280	09/13/10	1,4-Dioxane (IS1)	0.5795	0.6017	0.6017	3.8	3.8
			Naphthalene (IS2)	1.0015	1.0791	1.0791	7.7	7.7
			Fluorene (IS3)	1.2421	1.3344	1.3344	7.4	7.4
			Hexachlorobenzene (IS4)	0.2313	0.2388	0.2388	3.3	3.3
			Bis(2-ethylhexyl)phthalate (IS5)	0.6075	0.6965	0.6965	14.7	14.7
			Benzo(g,h,i)perylene (IS6)	1.0199	1.1030	1.1030	8.1	8.1
			Samples 14, 21 analyzed right after ICAL					

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	245887	204325
Naphthalene (IS2)	40/80	1708708	791701
Fluorene (IS3)	40/80	1256497	470807
Hexachlorobenzene (IS4)	40/80	374199	783406
Bis(2-ethylhexyl)phthalate (IS5)	40/80	1138942	817609
Benzo(g,h,i)perylene (IS6)	40/80	1820517	825293

LDC #: 24140A29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # 3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	61.0	61	61	0
2-Fluorobiphenyl	↓	68.5	69	69	↓
Terphenyl-d14	↓	76.5	76	76	↓
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 #: 24190 A24
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: MB
2nd Reviewer:

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 MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 27/28

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	2840	2830	0	2290	2280	81	81	80	80	0.03	0.04
Pentachlorophenol			↓								
Pyrene	2840	2830		2440	2470	86	86	85	85	0.8	0.8

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 #: 24140 A29

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: MG
2nd Reviewer: M

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 = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280 - 30961/2-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	2640	NA	1930	NA	73	73				
Pentachlorophenol										
Pyrene	2640		1990		75	75				

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 #: 24140A2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. # 3 , EEE

Conc. = $\frac{(4999)(40)(10ml)(10)(\quad)}{(818467)(0.6075)(31.7g)(0.9)(\quad)}$

= 137.9

≈ 140 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 31, 2010
LDC Report Date:	October 25, 2010
Matrix:	Soil/Water
Parameters:	Semivolatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6983-1

Sample Identification

RSAK2-1BPC
RSAK2-3BPC
RSAK2-5BPC
RSAK2-8BPC
RSAK2-10BPC**
SSAI3-07-1BPC
SSAI3-07-3BPC
SSAI3-07-5BPC
SSAI3-07-8BPC
SSAI3-07-8BPC_FD
SSAI3-07-10BPC
SSAK4-02-0.00BPC
SSAQ5-07-1BPC
SSAQ5-07-5BPC
SSAQ5-07-10BPC**
EB-08312010
RSAK2-5BPCMS
RSAK2-5BPCMSD
SSAQ5-07-1BPCMS
SSAQ5-07-1BPCMSD

**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 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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.

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 280-31029/1-A	9/12/10	Dimethylphthalate	190 ug/Kg	RSAK2-1BPC RSAK2-3BPC RSAK2-5BPC RSAK2-8BPC RSAK2-10BPC** SSAI3-07-1BPC SSAI3-07-3BPC SSAI3-07-5BPC SSAI3-07-8BPC SSAI3-07-8BPC_FD SSAI3-07-10BPC

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
RSAK2-1BPC	Dimethylphthalate	180 ug/Kg	180U ug/Kg
RSAK2-3BPC	Dimethylphthalate	69 ug/Kg	69U ug/Kg
RSAK2-5BPC	Dimethylphthalate	140 ug/Kg	140U ug/Kg
RSAK2-8BPC	Dimethylphthalate	180 ug/Kg	180U ug/Kg
RSAK2-10BPC**	Dimethylphthalate	160 ug/Kg	160U ug/Kg
SSAI3-07-1BPC	Dimethylphthalate	290 ug/Kg	290U ug/Kg
SSAI3-07-3BPC	Dimethylphthalate	220 ug/Kg	220U ug/Kg
SSAI3-07-5BPC	Dimethylphthalate	98 ug/Kg	98U ug/Kg
SSAI3-07-8BPC	Dimethylphthalate	350 ug/Kg	350U ug/Kg
SSAI3-07-8BPC_FD	Dimethylphthalate	100 ug/Kg	100U ug/Kg
SSAI3-07-10BPC	Dimethylphthalate	160 ug/Kg	160U ug/Kg
SSAK4-02-0.00BPC	Dimethylphthalate	190 ug/Kg	190U ug/Kg
SSAQ5-07-1BPC	Dimethylphthalate	130 ug/Kg	130U ug/Kg
SSAQ5-07-5BPC	Dimethylphthalate	150 ug/Kg	150U ug/Kg
SSAQ5-07-10BPC**	Dimethylphthalate	150 ug/Kg	150U ug/Kg

Sample EB-08312010 was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-08312010	8/31/10	Bis(2-ethylhexyl)phthalate	10 ug/L	All soil samples in SDG 280-6983-1

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAK2-3BPC	Bis(2-ethylhexyl)phthalate	47 ug/Kg	47U 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. 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.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6983-1	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 SSAI3-07-8BPC and SSAI3-07-8BPC_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
	SSAI3-07-8BPC	SSAI3-07-8BPC_FD				
Bis(2-ethylhexyl)phthalate	530	1000	61 (≤50)	-	J (all detects)	A
Dimethylphthalate	350	100	-	250 (≤350)	-	-
Fluoranthene	340U	38	-	302 (≤340)	-	-
Hexachlorobenzene	1300	10000	-	8700 (≤350)	J (all detects)	A
Octachlorostyrene	320	2200	-	1880 (≤350)	J (all detects)	A
Phenanthrene	17	110	-	93 (≤350)	-	-
Pyrene	340U	18	-	322 (≤340)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6983-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6983-1	RSAK2-1BPC RSAK2-3BPC RSAK2-5BPC RSAK2-8BPC RSAK2-10BPC** SSAI3-07-1BPC SSAI3-07-3BPC SSAI3-07-5BPC SSAI3-07-8BPC SSAI3-07-8BPC_FD SSAI3-07-10BPC SSAK4-02-0.00BPC SSAQ5-07-1BPC SSAQ5-07-5BPC SSAQ5-07-10BPC** EB-08312010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6983-1	SSAI3-07-8BPC SSAI3-07-8BPC_FD	Bis(2-ethylhexyl)phthalate	J (all detects)	A	Field duplicates (RPD) (fd)
280-6983-1	SSAI3-07-8BPC SSAI3-07-8BPC_FD	Hexachlorobenzene Octachlorostyrene	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-6983-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6983-1	RSAK2-1BPC	Dimethylphthalate	180U ug/Kg	A	bl
280-6983-1	RSAK2-3BPC	Dimethylphthalate	69U ug/Kg	A	bl
280-6983-1	RSAK2-5BPC	Dimethylphthalate	140U ug/Kg	A	bl
280-6983-1	RSAK2-8BPC	Dimethylphthalate	180U ug/Kg	A	bl
280-6983-1	RSAK2-10BPC**	Dimethylphthalate	160U ug/Kg	A	bl
280-6983-1	SSAI3-07-1BPC	Dimethylphthalate	290U ug/Kg	A	bl
280-6983-1	SSAI3-07-3BPC	Dimethylphthalate	220U ug/Kg	A	bl
280-6983-1	SSAI3-07-5BPC	Dimethylphthalate	98U ug/Kg	A	bl
280-6983-1	SSAI3-07-8BPC	Dimethylphthalate	350U ug/Kg	A	bl
280-6983-1	SSAI3-07-8BPC_FD	Dimethylphthalate	100U ug/Kg	A	bl
280-6983-1	SSAI3-07-10BPC	Dimethylphthalate	160U ug/Kg	A	bl
280-6983-1	SSAK4-02-0.00BPC	Dimethylphthalate	190U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6983-1	SSAQ5-07-1BPC	Dimethylphthalate	130U ug/Kg	A	bl
280-6983-1	SSAQ5-07-5BPC	Dimethylphthalate	150U ug/Kg	A	bl
280-6983-1	SSAQ5-07-10BPC**	Dimethylphthalate	150U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6983-1

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
280-6983-1	RSAK2-3BPC	Bis(2-ethylhexyl)phthalate	47U ug/Kg	A	be

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140B2a
SDG #: 280-6983-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: SG
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: 8/31/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	SW	
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	
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 = 9, 10
XVII.	Field blanks	SW	EB = 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: Soil + Water ** Indicates sample underwent Stage 4 validation

1	RSAK2-1BPC S	11	SSAI3-07-10BPC S	+ 21	MB 280-31029/1-A	31	
2	RSAK2-3BPC	12	SSAK4-02-0.00BPC	- 22 ✓	MB 280-30058/1-A	32	
3	RSAK2-5BPC	13	SSAQ5-07-1BPC	23		33	
4	RSAK2-8BPC	14	SSAQ5-07-5BPC	24		34	
5	RSAK2-10BPC**	15	SSAQ5-07-10BPC** ✓	25		35	
6	SSAI3-07-1BPC	16	EB-08312010 W	26		36	
7	SSAI3-07-3BPC	17	RSAK2-5BPCMS S	27		37	
8	SSAI3-07-5BPC	18	RSAK2-5BPCMSD	28		38	
9	SSAI3-07-8BPC D	19	SSAQ5-07-1BPCMS	29		39	
10	SSAI3-07-8BPC_FD D ✓	20	SSAQ5-07-1BPCMSD ✓	30		40	

LDC #: 24140 B2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVR
2nd Reviewer: W

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?	NA	✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	NA		✓	
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?	✓			

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 #: 24140 #24
SDG #: Bay Corner

VALIDATION FINDINGS WORKSHEET
Blanks

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

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.

(b l)

Blank extraction date: 9/12/10 **Blank analysis date:** _____
Conc. units: ug/kg Associated Samples: All S

Compound	Blank ID	Sample Identification								
	MB 280-31029/1-A		1	2	3	4	5	6	7	8
5x 950 CC	190		180 /4	69 /4	140 /4	180 /4	160 /4	290/4	220 /4	98 /4

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

Compound	Blank ID	Sample Identification								
	MB280-31029/1-A		9	10	11	12	13	14	15	
CC	190		350 /4	180 /4	160 /4	190 /4	130/4	150 /4	150 /4	

5x Phthalates
2x all others

LDC #: 29140 bm
SDG #: Sa Cam

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JG
2nd Reviewer: M

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

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: 8/31/10

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 11 ~~All ES~~ (be)

Compound	Blank ID	Sample Identification								
	16	2								
EEE	10	47/4								
		CAll others either			ND or	> 5x EB)				
CRQL										

5x
50

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC #: 24140 B2a

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

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

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

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

Y [✓ N] N/A Were percent recoveries (%R) for surrogates within QC limits?
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		12	TBP	39 (51-120)	No qual (only 1 out)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC#: 24140B2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	9	10				
Bis(2-ethylhexyl)phthalate	530	1000	61			Jdet/A (fd)
Dimethyl phthalate	350	100		250	≤350	
Fluoranthene	340U	38		302	≤340	
Hexachlorobenzene	1300	10000		8700	≤350	Jdet/A (fd)
Octachlorostyrene	320	2200		1880	≤350	Jdet/A (fd)
Phenanthrene	17	110		93	≤350	
Pyrene	340U	18		322	≤340	

LDC #: 24140 B2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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	9/13/2010	Phenol (IS1)	1.8397	1.8397	1.7733	1.7733	5.9	5.92
	MSS B		Naphthalene (IS2)	1.0767	1.0767	1.0396	1.0396	10.0	9.98
			Fluorene (IS3)	1.3777	1.3777	1.3051	1.3051	11.6	11.56
			Hexachlorobenzene (IS4)	0.2406	0.2406	0.2343	0.2343	6.0	6.03
			Bis(2-ethylhexyl)phthalate (IS5)	0.7243	0.7243	0.6681	0.6681	9.7	9.69
			Benzo(g,h,i)perylene (IS6)	1.1315	1.1315	1.0938	1.0938	3.8	3.80

)nc IS/Cpd	Area cpd	Area IS
40/50	579802	252134
40/50	1338510	994488
40/50	983140	570870
40/50	290330	965177
40/50	963068	1063669
40/50	1493397	1055901

Conc	Phenol	Naphthalene	Fluorene	Hexachlorob	bis(2-eh)phtha	Benzo(g,h,i)per
4.00	1.8394	1.1419	1.4534	0.2371	0.5406	1.0227
10.00	1.8341	1.1290	1.4363	0.2472	0.6101	1.1141
20.00	1.8662	1.1384	1.4299	0.2521	0.6785	1.1201
50.00	**1.8397**	**1.0767**	**1.3777**	**0.2406**	**0.7243**	**1.1315**
80.00	1.8227	1.0555	1.3340	0.2401	0.7348	1.1412
120.00	1.7552	0.9806	1.2121	0.2281	0.7081	1.0957
160.00	1.6515	0.9246	1.1457	0.2180	0.6863	1.0744
200.00	1.5775	0.8701	1.0514	0.2113	0.6617	1.0506
X =	1.7733	1.0396	1.3051	0.2343	0.6681	1.0938
S =	0.1049	0.1037	0.1509	0.0141	0.0647	0.0415

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 # 24140 B2a

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
Ax = Area of compound
Cx = Concentration of compound
RRF = continuing calibration RRF
Ais = Area of associated internal standard
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	B0491	09/17/10	Phenol	(IS1)	1.773	1.839	1.839	3.7	3.7
			Naphthalene	(IS2)	1.040	1.094	1.094	5.2	5.2
			Fluorene	(IS3)	1.305	1.362	1.362	4.3	4.4
			Hexachlorobenzene	(IS4)	0.234	0.243	0.243	3.5	3.5
			Bis(2-ethylhexyl)phthalate	(IS5)	0.668	0.762	0.762	14.1	14.1
			Benzo(g,h,i)perylene	(IS6)	1.094	1.160	1.160	6.1	6.1

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	815775	221784
Naphthalene	(IS2)	40/80	1926448	880800
Fluorene	(IS3)	40/80	1395413	512329
Hexachlorobenzene	(IS4)	40/80	415799	857059
Bis(2-ethylhexyl)phthalate	(IS5)	40/80	1380599	905803
Benzo(g,h,i)perylene	(IS6)	40/80	2086999	899230

LDC #: 24140 B29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # 5

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	67.6	68	68	0
2-Fluorobiphenyl		69.1	69	69	
Terphenyl-d14		72.9	73	73	
Phenol-d5	150	104.9	70	70	
2-Fluorophenol		100.1	67	67	
2,4,6-Tribromophenol		96.2	64	64	
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 #: 24140 B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JG
2nd Reviewer: _____

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: 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
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2740	2750	0	1870	1990	67	67	72	72	7	8
Pentachlorophenol			↓								
Pyrene	2740	2750	↓	2080	2110	76	76	77	77	2	1

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 #: 24140 B1G

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

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

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

LCS/LCSD samples: LCS280 - 31029/2-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	2620	NA	1980	NA	76	76				
Pentachlorophenol										
Pyrene	2620		1980		83	83				

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 #: 24140 B2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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. #5, EEE:

Conc. = $\frac{(85597)(40)(1\ ml)(1000)(\ )}{(94898)(0.668)(30.80\ g)(0.919)(\ )}$

= 190 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: September 2 through September 3, 2010

LDC Report Date: October 25, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7103-1

Sample Identification

SSAK6-05-4BPC
SSAK6-05-4BPC_FD
SSAK6-05-6BPC
SSAK6-05-8BPC
SSAK6-05-10BPC
SSAM7-06-1BPC
SSAM7-06-2BPC
SSAM7-06-3BPC
SSAN7-05-1BPC
SSAN7-05-2BPC
SSAN7-05-3BPC
SSAN7-05-1BPC_FD
SSAM5-04-10BPC**
SSAM5-04-1BPC
SSAM5-04-5BPC
SSAM5-04-5BPC_FD
SSAK8-08-1BPC
SSAK8-8-3BPC**
SSAK8-08-3BPC_FD
SSAN7-04-1BPC
SSAN7-04-2BPC
SSAN7-04-3BPC
SSAM7-07-1BPC
SSAM7-07-2BPC
SSAM7-07-3BPC**
SSAM7-07-3BPC_FD
EB-09022010
SSAK6-05-10BPCMS
SSAK6-05-10BPCMSD
SSAM7-06-3BPCMS
SSAM7-06-3BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 30 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 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
SSAK6-05-10BPC SSAK6-05-10BPCMS SSAK6-05-10BPCMSD	All TCL compounds	18	14	J- (all detects) UJ (all non-detects)	P

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.

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.

Sample EB-09022010 was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-09022010	9/2/10	Benzo(g,h,i)perylene	0.74 ug/L	SSAM7-06-1BPC SSAM7-06-2BPC SSAM7-06-3BPC SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-3BPC SSAN7-05-1BPC_FD SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD SSAN7-04-1BPC SSAN7-04-2BPC SSAN7-04-3BPC SSAM7-07-1BPC SSAM7-07-2BPC SSAM7-07-3BPC** SSAM7-07-3BPC_FD

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

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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-1BPC_FD SSAM7-07-1BPC SSAM7-07-3BPC_FD SSAM7-07-3BPC**	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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7103-1	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 SSAK6-05-4BPC and SSAK6-05-4BPC_FD, samples SSAN7-05-1BPC and SSAN7-05-1BPC_FD, samples SSAM5-04-5BPC and SSAM5-04-5BPC_FD, samples SSAK8-08-3BPC and SSAK8-08-3BPC_FD, and samples SSAM7-07-3BPC** and SSAM7-07-3BPC_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
	SSAK6-05-4BPC	SSAK6-05-4BPC_FD				
Dibenzo(a,h)anthracene	29	350U	-	321 (≤350)	-	-
Dimethylphthalate	360U	29	-	331 (≤360)	-	-
Hexachlorobenzene	350	330	-	20 (≤360)	-	-
Octachlorostyrene	170	130	-	40 (≤360)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN7-05-1BPC	SSAN7-05-1BPC_FD				
Benzo(a)anthracene	160	170	-	10 (≤380)	-	-
Benzo(a)pyrene	140	190	-	50 (≤380)	-	-
Benzo(b)fluoranthene	460	400	-	60 (≤360)	-	-
Benzo(g,h,i)perylene	380U	140	-	240 (≤380)	-	-
Bis(2-ethylhexyl)phthalate	79	190	-	111 (≤380)	-	-
Chrysene	220	220	-	0 (≤380)	-	-
Di-n-butyl phthalate	1200	360U	-	840 (≤360)	J (all detects) UJ (all non-detects)	A
Fluoranthene	160	150	-	10 (≤380)	-	-
Hexachlorobenzene	590	1200	-	610 (≤380)	J (all detects)	A
Indeno(1,2,3-cd)pyrene	110	100	-	10 (≤380)	-	-
Octachlorostyrene	250	390	-	140 (≤380)	-	-
Phenanthrene	30	360U	-	330 (≤360)	-	-
Pyrene	140	150	-	10 (≤380)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM5-04-5BPC	SSAM5-04-5BPC_FD				
Bis(2-ethylhexyl)phthalate	90	110	-	20 (≤350)	-	-
Hexachlorobenzene	350U	50	-	300 (≤350)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAK8-08-3BPC	SSAK8-08-3BPC_FD				
Bis(2-ethylhexyl)phthalate	150	100	-	50 (≤350)	-	-
Hexachlorobenzene	86	58	-	28 (≤350)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM7-07-3BPC**	SSAM7-07-3BPC_FD				
Benzo(a)anthracene	31	31	-	0 (≤360)	-	-
Benzo(a)pyrene	25	32	-	7 (≤360)	-	-
Benzo(b)fluoranthene	78	84	-	6 (≤360)	-	-
Benzo(g,h,i)perylene	26	34	-	8 (≤360)	-	-
Bis(2-ethylhexyl)phthalate	59	84	-	25 (≤360)	-	-
Chrysene	47	48	-	1 (≤360)	-	-
Fluoranthene	47	49	-	2 (≤360)	-	-
Hexachlorobenzene	1000	670	-	330 (≤360)	-	-
Octachlorostyrene	120	160	-	40 (≤360)	-	-
Pyrene	37	40	-	3 (≤360)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7103-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7103-1	SSAK6-05-10BPC	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
280-7103-1	SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-1BPC_FD SSAM7-07-1BPC SSAM7-07-3BPC_FD SSAM7-07-3BPC**	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-7103-1	SSAK6-05-4BPC SSAK6-05-4BPC_FD SSAK6-05-6BPC SSAK6-05-8BPC SSAK6-05-10BPC SSAM7-06-1BPC SSAM7-06-2BPC SSAM7-06-3BPC SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-3BPC SSAN7-05-1BPC_FD SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD SSAK8-08-1BPC SSAK8-8-3BPC** SSAK8-08-3BPC_FD SSAN7-04-1BPC SSAN7-04-2BPC SSAN7-04-3BPC SSAM7-07-1BPC SSAM7-07-2BPC SSAM7-07-3BPC** SSAM7-07-3BPC_FD EB-09022010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-7103-1	SSAN7-05-1BPC SSAN7-05-1BPC_FD	Di-n-butyl phthalate	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)
280-7103-1	SSAN7-05-1BPC SSAN7-05-1BPC_FD	Hexachlorobenzene	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

LDC #: 24140C2a
SDG #: 280-7103-1
Laboratory: Test America

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 10/22/10
Page: 1 of 1
Reviewer: NG
2nd Reviewer: W

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	SW	Sampling dates: 9/02-03/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
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	
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_1 = 1, 2 D_2 = 9, 12 D_3 = 15, 16 D_4 = 18, 19 D_5 = 25, 26
XVII.	Field blanks	SW	EB = 27

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	SSAK6-05-4BPC	D_1 S	11	SSAN7-05-3BPC	S	21	SSAN7-04-2BPC	S	31	MB 280-30977/1-A
2	SSAK6-05-4BPC_FD	D_1	12	SSAN7-05-1BPC_FD	D_2	22	SSAN7-04-3BPC		32	- 30983/1-A
3	SSAK6-05-6BPC		13	SSAM5-04-10BPC**		23	SSAM7-07-1BPC		33	- 31002/1-A
4	SSAK6-05-8BPC		14	SSAM5-04-1BPC		24	SSAM7-07-2BPC		34	- 32281/1-A
5	SSAK6-05-10BPC		15	SSAM5-04-5BPC	D_3	25	SSAM7-07-3BPC**	D_5	35	- 30599/1-A
6	SSAM7-06-1BPC		16	SSAM5-04-5BPC_FD	D_3	26	SSAM7-07-3BPC_FD	D_5	36	
7	SSAM7-06-2BPC		17	SSAK8-08-1BPC		27	EB-09022010	W	37	
8	SSAM7-06-3BPC		18	SSAK8-8-3BPC**	D_4	28	SSAK6-05-10BPC MS		38	
9	SSAN7-05-1BPC	D_2	19	SSAK8-08-3BPC_FD	D_4	29	↓ MSD		39	
10	SSAN7-05-2BPC		20	SSAN7-04-1BPC		30	SSAM7-06-3BPC MS		40	
							↓ MSD			

LDC #: 24146 C29

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: W

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 $\geq$ 0.990?	✓			
Were all percent relative standard deviations (%RSD) $\leq$ 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) $\leq$ 25% and relative response factors (RRF) $\geq$ 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?	✓			

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 #: 24140C29
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 BNA (EPA SW 846 Method 8270)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
5, 28, 29	S	N	9/03/10	9/21/10	9/22/10	18	J-/UJ/P

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 24140C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

(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: 9/02/10
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: ~~ATTBT~~ 6 - 16, 20 - 26

Compound	Blank ID	Sample Identification								
	27									
2x										
1.48 LLL	0.74		All results either ND or > 2x EB							
CRQL										

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC #: 24140C2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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
		9, 10, 12, 23, 25, 26	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140C2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVC
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	1	2				
Dibenzo(a,h)anthracene	29	350U		321	≤350	
Dimethylphthalate	360U	29		331	≤360	
Hexachlorobenzene	350	330		20	≤360	
Octachlorostyrene	170	130		40	≤360	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	9	12				
Benzo(a)anthracene	160	170		10	≤380	
Benzo(a)pyrene	140	190		50	≤380	
Benzo(b)fluoranthene	460	400		60	≤360	
Benzo(g,h,i)perylene	380U	140		240	≤380	
Bis(2-ethylhexyl)phthalate	79	190		111	≤380	
Chrysene	220	220		0	≤380	
Di-n-butyl phthalate	1200	360U		840	≤360	J/UJ/A (fd)
Fluoranthene	160	150		10	≤380	
Hexachlorobenzene	590	1200		610	≤380	Jdet/A (fd)
Indeno(1,2,3-cd)pyrene	110	100		10	≤380	
Octachlorostyrene	250	390		140	≤380	
Phenanthrene	30	360U		330	≤360	
Pyrene	140	150		10	≤380	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	15	16				
Bis(2-ethylhexyl)phthalate	90	110		20	≤350	
Hexachlorobenzene	350U	50		300	≤350	

LDC#: 24140C2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	18	19				
Bis(2-ethylhexyl)phthalate	150	100		50	≤350	
Hexachlorobenzene	86	58		28	≤350	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	25	26				
Benzo(a)anthracene	31	31		0	≤360	
Benzo(a)pyrene	25	32		7	≤360	
Benzo(b)fluoranthene	78	84		6	≤360	
Benzo(g,h,i)perylene	26	34		8	≤360	
Bis(2-ethylhexyl)phthalate	59	84		25	≤360	
Chrysene	47	48		1	≤360	
Fluoranthene	47	49		2	≤360	
Hexachlorobenzene	1000	670		330	≤360	
Octachlorostyrene	120	160		40	≤360	
Pyrene	37	40		3	≤360	

LDC #: 24140 C2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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	9/13/2010	1,4-Dioxane (IS1)	0.6266	0.6266	0.6356	0.6357	6.2	6.18
	MSS B		Naphthalene (IS2)	1.0767	1.0767	1.0396	1.0396	10.0	9.98
			Fluorene (IS3)	1.3777	1.3777	1.3051	1.3051	11.6	11.56
			Hexachlorobenzene (IS4)	0.2406	0.2406	0.2343	0.2343	6.0	6.03
			Bis(2-ethylhexyl)phthalate (IS5)	0.7243	0.7243	0.6681	0.6681	9.7	9.69
			Benzo(g,h,i)perylene (IS6)	1.1315	1.1315	1.0938	1.0938	3.8	3.80

)nc IS/Cpd	Area cpd	Area IS
40/50	197471	252134
40/50	1338510	994488
40/50	983140	570870
40/50	290330	965177
40/50	963068	1063669
40/50	1493397	1055901

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	bis(2-eh)phtha	Benzo(g,h,i)per
4.00	0.7296	1.1419	1.4534	0.2371	0.5406	1.0227
10.00	0.6351	1.1290	1.4363	0.2472	0.6101	1.1141
20.00	0.6284	1.1384	1.4299	0.2521	0.6785	1.1201
50.00	**0.6266**	**1.0767**	**1.3777**	**0.2406**	**0.7243**	**1.1315**
80.00	0.6289	1.0555	1.3340	0.2401	0.7348	1.1412
120.00	0.6226	0.9806	1.2121	0.2281	0.7081	1.0957
160.00	0.6087	0.9246	1.1457	0.2180	0.6863	1.0744
200.00	0.6054	0.8701	1.0514	0.2113	0.6617	1.0506
X =	0.6357	1.0396	1.3051	0.2343	0.6681	1.0938
S =	0.0393	0.1037	0.1509	0.0141	0.0647	0.0415

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 # 24140 C2a

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
Ax = Area of compound
Cx = Concentration of compound
RRF = continuing calibration RRF
Ais = Area of associated internal standard
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	B0548	09/18/10	1,4-Dioxane (IS1)	0.636	0.612	0.612	3.8	3.8
			Naphthalene (IS2)	1.040	1.051	1.051	1.1	1.1
			Fluorene (IS3)	1.305	1.283	1.283	1.7	1.7
			Hexachlorobenzene (IS4)	0.234	0.233	0.233	0.7	0.7
			Bis(2-ethylhexyl)phthalate (IS5)	0.668	0.752	0.752	12.5	12.5
			Benzo(g,h,i)perylene (IS6)	1.094	1.077	1.077	1.5	1.5
2	B0598	09/20/10	1,4-Dioxane (IS1)	0.636	0.611	0.611	3.8	3.8
			Naphthalene (IS2)	1.040	1.050	1.050	1.0	1.0
			Fluorene (IS3)	1.305	1.307	1.307	0.2	0.2
			Hexachlorobenzene (IS4)	0.234	0.233	0.233	0.4	0.4
			Bis(2-ethylhexyl)phthalate (IS5)	0.668	0.761	0.761	13.9	13.9
			Benzo(g,h,i)perylene (IS6)	1.094	1.042	1.042	4.7	4.7

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	323105	264090	304878	249345
Naphthalene (IS2)	40/80	2196496	1045249	2065517	983381
Fluorene (IS3)	40/80	1570034	611700	1469517	562017
Hexachlorobenzene (IS4)	40/80	472647	1015623	442141	947199
Bis(2-ethylhexyl)phthalate (IS5)	40/80	1565882	1041505	1435607	943374
Benzo(g,h,i)perylene (IS6)	40/80	2262454	1049866	1842157	883736

LDC #: 24196 C2a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # 13

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	82.4	82	82	0
2-Fluorobiphenyl	↓	82.9	83	83	↓
Terphenyl-d14	↓	92.7	93	93	↓
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 #: 24140 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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: 30/31

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	2940	2950	0	2310	2330	78	78.4	79	79	0.8	0.9
Pentachlorophenol											
Pyrene	2940	2950		2700	2740	92	92	93	93	1	1

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 #: 24140C2A

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

Reviewer: MC
2nd Reviewer: [illegible]

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

LCS/LCSD samples: LCS 280-31002/2-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	2610	NA	2140	NA	82	82				
Pentachlorophenol										
Pyrene	2610		2160		83	83				

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 #: 74140 C2A

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. ~~1235~~ SS

Conc. = $\frac{(14359)(40)(1\ ml)(1000)(\ )}{(866023)(0,2345)(30.48)(0,904)(\ )}$

= 1030.0

≈ 1000 ng/kg

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

28.30648

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 7, 2010
LDC Report Date:	October 25, 2010
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7117-1

Sample Identification

SSAN8-06-0BPC
SSAN8-05-0BPC
SSAN7-06-0BPC
SSAN7-07-0BPC
SSAN8-03-0BPC
SSAN8-04-0BPC
SSAN8-07-0BPC
SSAN8-07-0BPC_FD
SSAN7-06-0BPCMS
SSAN7-06-0BPCMSD

Introduction

This data review covers 10 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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. 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.

No field blanks were identified in this SDG.

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 percent recovery (%R) was not within QC limits for one compound, the MSD percent recovery (%R) was 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) 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

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAN8-06-0BPC SSAN8-05-0BPC SSAN8-07-0BPC	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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7117-1	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAN8-07-0BPC and SSAN8-07-0BPC_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
	SSAN8-07-0BPC_FD	SSAN8-07-0BPC_FD				
Anthracene	27	330U	-	303 (≤330)	-	-
Benzo(a)anthracene	220	330U	-	110 (≤330)	-	-
Benzo(a)pyrene	160	330U	-	170 (≤330)	-	-
Benzo(b)fluoranthene	360	330U	-	30 (≤330)	-	-
Benzo(g,h,i)perylene	98	330U	-	232 (≤330)	-	-
Chrysene	260	330U	-	70 (≤330)	-	-
Di-n-octylphthalate	330U	56	-	274 (≤330)	-	-
Fluoranthene	550	330U	-	220 (≤330)	-	-
Hexachlorobenzene	39	330U	-	291 (≤330)	-	-
Indeno(1,2,3-cd)pyrene	77	330U	-	253 (≤330)	-	-
Phenanthrene	220	330U	-	110 (≤330)	-	-
Pyrene	450	13	-	437 (≤330)	J (all detects)	A

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7117-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7117-1	SSAN8-06-0BPC SSAN8-05-0BPC SSAN8-07-0BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-7117-1	SSAN8-06-0BPC SSAN8-05-0BPC SSAN7-06-0BPC SSAN7-07-0BPC SSAN8-03-0BPC SSAN8-04-0BPC SSAN8-07-0BPC SSAN8-07-0BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-7117-1	SSAN8-07-0BPC SSAN8-07-0BPC_FD	Pyrene	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-7117-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-7117-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24140D2a
SDG #: 280-7117-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: W

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: 9/07/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	JVG SW A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 7, 8
XVII.	Field blanks	N	

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: All Soils

1	SSAN8-06-0BPC	11	MB 280-31791/1-A	21		31	
2	SSAN8-05-0BPC	12		22		32	
3	SSAN7-06-0BPC	13		23		33	
4	SSAN7-07-0BPC	14		24		34	
5	SSAN8-03-0BPC	15		25		35	
6	SSAN8-04-0BPC	16		26		36	
7	SSAN8-07-0BPC b	17		27		37	
8	SSAN8-07-0BPC_FD D	18		28		38	
9	SSAN7-06-0BPCMS	19		29		39	
10	SSAN7-06-0BPCMSD	20		30		40	

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 #: 24140 D2 a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JV6
2nd Reviewer:

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 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?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		9/10	JJJ	46 (54-120)	( )	( )	1	No qual (MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 24140 D2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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
		1, 2, 7	GGG, HHH peaks unresolved, lab need total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140D2a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: DK

2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	7	8				
Anthracene	27	330U		303	≤330	
Benzo(a)anthracene	220	330U		110	≤330	
Benzo(a)pyrene	160	330U		170	≤330	
Benzo(b)fluoranthene	360	330U		30	≤330	
Benzo(g,h,i)perylene	98	330U		232	≤330	
Chrysene	260	330U		70	≤330	
Di-n-octyl phthalate	330U	56		274	≤330	
Fluoranthene	550	330U		220	≤330	
Hexachlorobenzene	39	330U		291	≤330	
Indeno(1,2,3-cd)pyrene	77	330U		253	≤330	
Phenanthrene	220	330U		110	≤330	J
Pyrene	450	13		437	≤330	J

V:\FIELD DUPLICATES\24140D2a.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 7, 2010

LDC Report Date: October 25, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7183-1

Sample Identification

SSAP4-02-10BPC**
SSAP4-02-1BPC
SSAP4-02-5BPC
SSAP4-02-1BPC_FD
SSAP4-01-10BPC
SSAP4-01-1BPC
SSAP4-01-5BPC
SSAP5-02-1BPC
SSAP5-02-2BPC
SSAP5-02-3BPC
SSAP6-01-1BPC
SSAP6-01-2BPC**
SSAP6-01-3BPC
SSAP6-01-3BPC_FD
SSAP4-01-10BPC_FD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 15 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 280-32100/1-A	9/19/10	Bis(2-ethylhexyl)phthalate	97.3 ug/Kg	SSAP4-02-1BPC_FD SSAP4-01-10BPC SSAP4-01-1BPC SSAP4-01-5BPC SSAP5-02-1BPC SSAP5-02-2BPC SSAP5-02-3BPC SSAP6-01-1BPC SSAP6-01-2BPC** SSAP6-01-3BPC SSAP6-01-3BPC_FD SSAP4-01-10BPC_FD

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
SSAP4-02-1BPC_FD	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
SSAP4-01-10BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAP5-02-2BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAP5-02-3BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAP6-01-1BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
SSAP6-01-3BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
SSAP6-01-3BPC_FD	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAP4-01-10BPC_FD	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg

No field blanks were identified in this SDG.

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

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.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAP4-01-1BPC	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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7183-1	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.

XVI. Field Duplicates

Samples SSAP4-02-1BPC and SSAP4-02-1BPC_FD, samples SSAP6-01-3BPC and SSAP6-01-3BPC_FD, and samples SSAP4-01-10BPC and SSAP4-01-10BPC_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
	SSAP4-02-1BPC	SSAP4-02-1BPC_FD				
Bis(2-ethylhexyl)phthalate	340U	120	-	220 (≤340)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAP4-01-10BPC	SSAP4-01-10BPC_FD				
Bis(2-ethylhexyl)phthalate	110	100	-	10 (≤350)	-	-
Hexachlorobenzene	62	32	-	30 (≤350)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAP6-01-3BPC	SSAP6-01-3BPC_FD				
Bis(2-ethylhexyl)phthalate	120	110	-	10 (≤360)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7183-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7183-1	SSAP4-01-1BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-7183-1	SSAP4-02-10BPC** SSAP4-02-1BPC SSAP4-02-5BPC SSAP4-02-1BPC_FD SSAP4-01-10BPC SSAP4-01-1BPC SSAP4-01-5BPC SSAP5-02-1BPC SSAP5-02-2BPC SSAP5-02-3BPC SSAP6-01-1BPC SSAP6-01-2BPC** SSAP6-01-3BPC SSAP6-01-3BPC_FD SSAP4-01-10BPC_FD	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 280-7183-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7183-1	SSAP4-02-1BPC_FD	Bis(2-ethylhexyl)phthalate	120U ug/Kg	A	bl
280-7183-1	SSAP4-01-10BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-7183-1	SSAP5-02-2BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-7183-1	SSAP5-02-3BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-7183-1	SSAP6-01-1BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	A	bl
280-7183-1	SSAP6-01-3BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	A	bl
280-7183-1	SSAP6-01-3BPC_FD	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-7183-1	SSAP4-01-10BPC_FD	Bis(2-ethylhexyl)phthalate	100U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-7183-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140E2a
SDG #: 280-7183-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JVC
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: 9/07/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r ✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	LCS
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_1 = 2, 4 D_2 = 13, 14 D_3 = 5, 15
XVII.	Field blanks	N	

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

All soils

1	SSAP4-02-10BPC**	11	SSAP6-01-1BPC	21	MB 280-31791/1-A	31	
2	SSAP4-02-1BPC D_1	12	SSAP6-01-2BPC**	22	MB 280-32110/1-A	32	
3	SSAP4-02-5BPC	13	SSAP6-01-3BPC D_2	23		33	
4	SSAP4-02-1BPC_FD D_1	14	SSAP6-01-3BPC_FD D_2	24		34	
5	SSAP4-01-10BPC D_3	15	SSAP4-01-10BPC_FD D_3	25		35	
6	SSAP4-01-1BPC	16		26		36	
7	SSAP4-01-5BPC	17		27		37	
8	SSAP5-02-1BPC	18		28		38	
9	SSAP5-02-2BPC	19		29		39	
10	SSAP5-02-3BPC	20		30		40	

LDC #: 24140 E 2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVR
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 duplicate				
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 #: 24140E2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JV
2nd Reviewer: ✓

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 #: 24140 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer:

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: 9/19/10 **Blank analysis date:** 9/20/10
Conc. units: ug/kg Associated Samples: 4-15 (bl)

Compound	Blank ID	Sample Identification								
MB	280-32100/1-A	4	5	6	9	10	11	13	14	15
EEE	97.3	120 /u	110 /u	(1000)	110 /u	110 /u	100 /u	120 /u	110 /u	100 /u

5x
486.5

Blank extraction date: _____ **Blank analysis date:** _____
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 24140 E2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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
		6	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140E2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MK
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	2	4				
Bis(2-ethylhexyl)phthalate	340U	120		220	≤340	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	5	15				
Bis(2-ethylhexyl)phthalate	110	100		10	≤350	
Hexachlorobenzene	62	32		30	≤350	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	13	14				
Bis(2-ethylhexyl)phthalate	120	110		10	≤360	

LDC #: 24140 E7
SDG #: Sre Cmv

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	8/27/2010	1,4-Dioxane (IS1)	0.5926	0.5926	0.5795	0.5795	3.7	3.74
	MSS K		Naphthalene (IS2)	1.0571	1.0571	1.0015	1.0015	8.9	8.92
			Fluorene (IS3)	1.3180	1.3180	1.2421	1.2421	7.9	7.87
			Hexachlorobenzene (IS4)	0.2424	0.2424	0.2313	0.2313	6.1	6.04
			Chrysene (IS5)	1.1257	1.1257	1.0679	1.0679	9.3	9.33
			Benzo(g,h,i)perylene (IS6)	1.1231	1.1231	1.0199	1.0199	7.5	7.53

)nc IS/Cpd	Area cpd	Area IS
40/50	127636	172314
40/50	884641	669515
40/50	648342	393544
40/50	200827	662745
40/50	1068947	759660
40/50	1096793	781265

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.5778	1.1018	1.3240		1.1929	0.9595
10.00	0.6003	1.0722	1.3327	0.2454	1.1472	1.0450
20.00	0.6103	1.0714	1.3075	0.2448	1.1400	1.0900
50.00	**0.5926**	**1.0571**	**1.3180**	**0.2424**	**1.1257**	**1.1231**
80.00	0.5842	1.0008	1.2564	0.2335	1.0651	1.0769
120.00	0.5678	0.9489	1.1901	0.2252	0.9953	1.0108
160.00	0.5547	0.8964	1.1248	0.2168	0.9529	0.9476
200.00	0.5485	0.8636	1.0833	0.2109	0.9244	0.9066
X =	0.5795	1.0015	1.2421	0.2313	1.0679	1.0199
S =	0.0217	0.0893	0.0977	0.0140	0.0997	0.0768

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 #: 29140E2q

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	9/15/2010	Phenol (IS1)	see r2 calculations					
	MSS D		Naphthalene (IS2)	1.0439	1.0439	1.0514	1.0514	4.8	4.84
			Fluorene (IS3)	1.2658	1.2658	1.2948	1.2948	7.9	7.89
			Hexachlorobenzene (IS4)	0.2207	0.2207	0.2343	0.2343	10.0	9.97
			Chrysene (IS5)	1.0079	1.0079	1.0117	1.0117	4.2	4.18
			Benzo(g,h,i)perylene (IS6)	1.0014	1.0014	1.0046	1.0046	11.2	11.18

Conc IS/Cpd	Area cpd	Area IS
40/50	185677	244285
40/50	1220003	934927
40/50	955330	603765
40/50	287832	1043323
40/50	1463728	1161848
40/50	1287934	1028955

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chysene	Benzo(g,h,i)per
4.00	r2	0.9661	1.1493		0.9354	0.8279
10.00		1.0094	1.1995	0.2011	0.9893	0.8797
20.00		1.0162	1.2174	0.2187	0.9758	0.9418
50.00		**1.0439**	**1.2658**	**0.2207**	**1.0079**	**1.0014**
80.00		1.0792	1.3399	0.2351	1.0501	1.0538
120.00		1.0903	1.3533	0.2393	1.0414	1.0832
160.00		1.0932	1.3954	0.2547	1.0532	1.1164
200.00		1.1130	1.4378	0.2704	1.0404	1.1329
X =	#DIV/0!	1.0514	1.2948	0.2343	1.0117	1.0046
S =	#DIV/0!	0.0509	0.1022	0.0234	0.0423	0.1123

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 # 24140 E2c

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JW
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8270C

Parameter: 1,4-Dioxane

Date	Column	Compound	Y area ratio	X conc ratio	X^2	
09/15/2010	Not specified	1,4-Dioxane	0.0984	0.100		0.9837
			0.1765	0.250		0.7058
			0.3444	0.500		0.6888
			0.7601	1.250		0.6081
			1.2284	2.000		0.6142
			1.8454	3.000		0.6151
			2.3578	4.000		0.5895
			3.0143	5.000		0.6029
						0.6760

Regression Output:		Reported	
Constant	0.03708	c =	-0.065000
Std Err of Y Est	0.02621		
R Squared	0.99950	r2 =	0.998700
No. of Observations	8.00000		
Degrees of Freedom	6.00000		
X Coefficient(s) 0.591839		m =	0.590000
Std Err of Coef. 0.005410			

LDC # 34140 Em

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	K6629	09/22/10	1,4-Dioxane	(IS1)	0.5795	0.6104	0.6104	5.3	5.3
			Naphthalene	(IS2)	1.0015	1.0651	1.0651	6.3	6.3
			Fluorene	(IS3)	1.2421	1.3197	1.3197	6.2	6.2
			Hexachlorobenzene	(IS4)	0.2313	0.2436	0.2436	5.3	5.3
			Chrysene	(IS5)	1.0679	1.1189	1.1189	4.8	4.8
			Benzo(g,h,i)perylene	(IS6)	1.0199	1.1145	1.1145	9.3	9.3
2	D8768	09/20/10	1,4-Dioxane	(IS1)	80000	68600	68625	14.3	14.3
			Naphthalene	(IS2)	1.051	1.105	1.105	5.1	5.1
			Fluorene	(IS3)	1.295	1.363	1.363	5.3	5.3
			Hexachlorobenzene	(IS4)	0.234	0.247	0.247	5.5	5.5
			Chrysene	(IS5)	1.012	1.025	1.025	1.3	1.3
			Benzo(g,h,i)perylene	(IS6)	1.005	1.100	1.100	9.4	9.4

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	325560	266683	236496	225113
Naphthalene	(IS2)	40/80	2174804	1020961	1906904	862593
Fluorene	(IS3)	40/80	1584055	600149	1446320	530492
Hexachlorobenzene	(IS4)	40/80	478292	981724	447244	904839
Chrysene	(IS5)	40/80	2326620	1039694	2178908	1062945
Benzo(g,h,i)perylene	(IS6)	40/80	2399208	1076340	1920793	873138

LDC #: 24140 E2c

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JM
2nd reviewer:

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: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	70.4	70	70	0
2-Fluorobiphenyl	↓	72.8	73	73	↓
Terphenyl-d14	↓	75.3	75	75	↓
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 #: 24168E2A

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

Reviewer: JVG
2nd Reviewer:

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

LCS/LCSD samples: LCS 280 31791 /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	2660	NA	2020	NA	77	77				
Pentachlorophenol										
Pyrene	2660		2100		79	79				

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 #: 24140 E2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JM
2nd reviewer: [signature]

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. _____ . ND

Conc. = $\frac{(\quad)(\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)(\quad)(\quad)}$

=

#	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:	September 8, 2010
LDC Report Date:	October 25, 2010
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7229-1

Sample Identification

SSAO8-04-0BPC
SSAO8-07-0BPC
SSAO7-04-0BPC

Introduction

This data review covers 3 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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. 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.

No field blanks were identified in this SDG.

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

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.

VIII. Laboratory Control Samples (LCS)

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

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7229-1	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were idenitifed in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7229-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7229-1	SSAO8-04-0BPC SSAO8-07-0BPC SSAO7-04-0BPC	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 280-7229-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-7229-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24140F2a
SDG #: 280-7229-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: [signature]

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: 9/08/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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: All Soils

1	SSAO8-04-0BPC	11		21		31	
2	SSAO8-07-0BPC	12		22		32	
3	SSAO7-04-0BPC	13		23		33	
4	MB 280-31791/1-A	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	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 10, 2010
LDC Report Date:	October 25, 2010
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7342-1

Sample Identification

SSAO7-08-0BPC
SSAO7-07-0BPC**
SSAO8-12-0BPC
SSAO8-09-0BPC
SSAO8-06-0BPC
SSAO8-12-0BPC_FD
SSAO7-07-0BPCMS
SSAO7-07-0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 8 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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.

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 280-32100/1-A	9/19/10	Bis(2-ethylhexyl)phthalate	97.3 ug/Kg	SSAO7-08-0BPC SSAO7-07-0BPC** SSAO8-12-0BPC

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280-32399/1-A	9/21/10	Bis(2-ethylhexyl)phthalate	92.8 ug/Kg	SSAO8-09-0BPC SSAO8-06-0BPC SSAO8-12-0BPC_FD

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
SSAO7-08-0BPC (4.0X)	Bis(2-ethylhexyl)phthalate	670 ug/Kg	670U ug/Kg
SSAO7-07-0BPC**	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAO8-12-0BPC	Bis(2-ethylhexyl)phthalate	98 ug/Kg	98U ug/Kg
SSAO8-09-0BPC	Bis(2-ethylhexyl)phthalate	220 ug/Kg	220U ug/Kg
SSAO8-06-0BPC	Bis(2-ethylhexyl)phthalate	350 ug/Kg	350U ug/Kg
SSAO8-12-0BPC_FD	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg

No field blanks were identified in this SDG.

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) 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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAO7-08-0BPC SSAO8-09-0BPC SSAO8-06-0BPC	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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7342-1	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 SSAO8-12-0BPC and SSAO8-12-0BPC_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
	SSAO8-12-0BPC	SSAO8-12-0BPC_FD				
2-Methylnaphthalene	24	100	-	76 (≤330)	-	-
Acenaphthene	30	57	-	27 (≤330)	-	-
Bis(2-ethylhexyl)phthalate	98	110	-	12 (≤330)	-	-
Dimethylphthalate	330U	27	-	303 (≤330)	-	-
Naphthalene	330U	250	-	80 (≤330)	-	-
Phenanthrene	17	330U	-	313 (≤330)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7342-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7342-1	SSAO7-08-0BPC SSAO8-09-0BPC SSAO8-06-0BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-7342-1	SSAO7-08-0BPC SSAO7-07-0BPC** SSAO8-12-0BPC SSAO8-09-0BPC SSAO8-06-0BPC SSAO8-12-0BPC_FD	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 280-7342-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7342-1	SSAO7-08-0BPC (4.0X)	Bis(2-ethylhexyl)phthalate	670U ug/Kg	A	bl
280-7342-1	SSAO7-07-0BPC**	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-7342-1	SSAO8-12-0BPC	Bis(2-ethylhexyl)phthalate	98U ug/Kg	A	bl
280-7342-1	SSAO8-09-0BPC	Bis(2-ethylhexyl)phthalate	220U ug/Kg	A	bl
280-7342-1	SSAO8-06-0BPC	Bis(2-ethylhexyl)phthalate	350U ug/Kg	A	bl
280-7342-1	SSAO8-12-0BPC_FD	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-7342-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140G2a
SDG #: 280-7342-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

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: 9/10/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
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 = 3, 6
XVII.	Field blanks	~~N~~	~~EB = EB 091020/0 (from 280-7344-1)~~

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

All Soils

1	SSAO7-08-0BPC	11	MB 280-32100/1-A	21		31		
2	SSAO7-07-0BPC**	12	MB 280-32399/1-A	22		32		
3	SSAO8-12-0BPC D	13		23		33		
4	SSAO8-09-0BPC	14		24		34		
5	SSAO8-06-0BPC	15		25		35		
6	SSAO8-12-0BPC_FD D	16		26		36		
7	SSAO7-07-0BPCMS	17		27		37		
8	SSAO7-07-0BPCMSD	18		28		38		
9		19		29		39		
10		20		30		40		

LDC #: 24140 G 2A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVR
2nd Reviewer: [illegible]

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. Surrogates				
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 #: 74140 G2c

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
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.	✓X	✓		
Target compounds were detected in the field blanks.		✓X	✓	

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 #: 24140G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
2nd Reviewer:

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: 9/19/10 **Blank analysis date:** 9/20/10 Associated Samples: 1-3 (bl)
Conc. units: ug/kg

Compound	Blank ID	Sample Identification								
MB	280-32100/1-A	1 (4.0x)	2	3						
EEE	97.3	670 /u	110 /u	98 /u						

5x
86.5

Blank extraction date: 9/21/10 **Blank analysis date:** 9/28/10 Associated Samples: 4-6 (bl)
Conc. units: ug/kg

Compound	Blank ID	Sample Identification								
MB	280-32399/4-A		4	5	6					
EEE	92.8		220 /u	350 /u	110 /u					

5x
64

5x Phthalates
2x all others

LDC #: 34160 G2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JM
2nd Reviewer: [signature]

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
		1, 4, 5	GGG, HHH peaks unresolved, lab need total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140G2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: NV
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	3	6				
2-Methylnaphthalene	24	100		76	≤330	
Acenaphthene	30	57		27	≤330	
Bis(2-ethylhexyl)phthalate	98	110		12	≤330	
Dimethyl phthalate	330U	27		303	≤330	
Naphthalene	330U	250		80	≤330	
Phenanthrene	17	330U		313	≤330	

LDC #: _____

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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	9/15/2010	1,4-Dioxane (IS1)	see r2 calculations					
	MSS D		Naphthalene (IS2)	1.0439	1.0439	1.0514	1.0514	4.8	4.84
			Fluorene (IS3)	1.2658	1.2658	1.2948	1.2948	7.9	7.89
			Hexachlorobenzene (IS4)	0.2207	0.2207	0.2343	0.2343	10.0	9.97
			Chrysene (IS5)	1.0079	1.0079	1.0117	1.0117	4.2	4.18
			Benzo(g,h,i)perylene (IS6)	1.0014	1.0014	1.0046	1.0046	11.2	11.18

)nc IS/Cpd	Area cpd	Area IS
40/50	185677	244285
40/50	1220003	934927
40/50	955330	603765
40/50	287832	1043323
40/50	1463728	1161848
40/50	1287934	1028955

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chysene	Benzo(g,h,i)per
4.00	r2	0.9661	1.1493		0.9354	0.8279
10.00		1.0094	1.1995	0.2011	0.9893	0.8797
20.00		1.0162	1.2174	0.2187	0.9758	0.9418
50.00		**1.0439**	**1.2658**	**0.2207**	**1.0079**	**1.0014**
80.00		1.0792	1.3399	0.2351	1.0501	1.0538
120.00		1.0903	1.3533	0.2393	1.0414	1.0832
160.00		1.0932	1.3954	0.2547	1.0532	1.1164
200.00		1.1130	1.4378	0.2704	1.0404	1.1329
X =	#DIV/0!	1.0514	1.2948	0.2343	1.0117	1.0046
S =	#DIV/0!	0.0509	0.1022	0.0234	0.0423	0.1123

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 # 24140 62a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JG
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8270C

Parameter: 1,4-Dioxane

Date	Column	Compound	Y area ratio	X conc ratio	X^2	
09/15/2010	Not specified	1,4-Dioxane	0.0984	0.100		0.9837
			0.1765	0.250		0.7058
			0.3444	0.500		0.6888
			0.7601	1.250		0.6081
			1.2284	2.000		0.6142
			1.8454	3.000		0.6151
			2.3578	4.000		0.5895
			3.0143	5.000		0.6029
						0.6760

Regression Output:			Reported
Constant	0.03708	c =	-0.065000
Std Err of Y Est	0.02621		
R Squared	0.99950	r2 =	0.998700
No. of Observations	8.00000		
Degrees of Freedom	6.00000		
X Coefficient(s) 0.591839		m =	0.590000
Std Err of Coef. 0.005410			

LDC # 24140 Gra

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
Ax = Area of compound
Cx = Concentration of compound
RRF = continuing calibration RRF
Ais = Area of associated internal standard
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	D8768	09/20/10	1,4-Dioxane	(IS1)	80000.000	68600.000	68624.800	14.2	14.3
			Naphthalene	(IS2)	1.051	1.105	1.105	5.1	5.1
	MSS D		Fluorene	(IS3)	1.295	1.363	1.363	5.3	5.3
			Hexachlorobenzene	(IS4)	0.234	0.247	0.247	5.5	5.5
			Chrysene	(IS5)	1.012	1.025	1.025	1.3	1.3
			Benzo(g,h,i)perylene	(IS6)	1.005	1.100	1.100	9.5	9.5

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	236496	225113
Naphthalene	(IS2)	40/80	1906904	862593
Fluorene	(IS3)	40/80	1446320	530492
Hexachlorobenzene	(IS4)	40/80	447244	904839
Chrysene	(IS5)	40/80	2178908	1062945
Benzo(g,h,i)perylene	(IS6)	40/80	1920793	873138

LDC #: 24140 G29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # ✓

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	84.6	85	85	0
2-Fluorobiphenyl	↓	82.3	82	82	↓
Terphenyl-d14	↓	102.0	102	102	↓
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 #: 29140 G2q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JM
2nd Reviewer:

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

MS/MSD samples: 7/8

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	2490	2490	0	2030	2120	81	81	85	85	4	4
Pentachlorophenol											
Pyrene	2490	2490	12	2280	2310	91	91	93	93	1	1

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 #: 24140 G2A

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

Reviewer: JVC
2nd Reviewer: [signature]

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

LCS/LCSD samples: LCS 280-32100/2-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	2610	NA	2160	NA	83	83				
Pentachlorophenol		↓		↓						
Pyrene	2610	↓	2510	↓	96	96				

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 #: 24140 G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: DVG
2nd reviewer: [illegible]

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

(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. # 7, SS [redacted]

Conc. = $\frac{(11144)(40)(1ml)(1uL)(\quad)}{(1085068)(0.234)(31.3g)(0.981)(\quad)}$

= 57.18

≈ 57 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:	September 10, 2010
LDC Report Date:	October 25, 2010
Matrix:	Soil/Water
Parameters:	Semivolatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7344-1

Sample Identification

SSAJ8-03-1BPC
SSAJ8-03-3BPC
SSAJ8-03-3BPC_FD
SSAJ8-03-5BPC
SSAJ8-03-8BPC
SSAJ8-03-10BPC**
EB-09102010
SSAJ8-03-10BPCMS
SSAJ8-03-10BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 8 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 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 280-32399/1-A	9/21/10	Bis(2-ethylhexyl)phthalate	92.8 ug/Kg	All soil samples in SDG 280-7344-1

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
SSAJ8-03-1BPC	Bis(2-ethylhexyl)phthalate	97 ug/Kg	97U ug/Kg
SSAJ8-03-3BPC	Bis(2-ethylhexyl)phthalate	96 ug/Kg	96U ug/Kg
SSAJ8-03-3BPC_FD	Bis(2-ethylhexyl)phthalate	96 ug/Kg	96U ug/Kg
SSAJ8-03-5BPC	Bis(2-ethylhexyl)phthalate	94 ug/Kg	94U ug/Kg
SSAJ8-03-8BPC	Bis(2-ethylhexyl)phthalate	87 ug/Kg	87U ug/Kg
SSAJ8-03-10BPC**	Bis(2-ethylhexyl)phthalate	95 ug/Kg	95U ug/Kg

Sample EB-09102010 was identified as an equipment blank. No semivolatile 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.

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) 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.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7344-1	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 SSAJ8-03-3BPC and SSAJ8-03-3BPC_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
	SSAJ8-03-3BPC	SSAJ8-03-3BPC_FD				
Bis(2-ethylhexyl)phthalate	96	96	-	0 (≤350)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7344-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7344-1	SSAJ8-03-1BPC SSAJ8-03-3BPC SSAJ8-03-3BPC_FD SSAJ8-03-5BPC SSAJ8-03-8BPC SSAJ8-03-10BPC** EB-09102010	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 280-7344-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-7344-1	SSAJ8-03-1BPC	Bis(2-ethylhexyl)phthalate	97U ug/Kg	A	bl
280-7344-1	SSAJ8-03-3BPC	Bis(2-ethylhexyl)phthalate	96U ug/Kg	A	bl
280-7344-1	SSAJ8-03-3BPC_FD	Bis(2-ethylhexyl)phthalate	96U ug/Kg	A	bl
280-7344-1	SSAJ8-03-5BPC	Bis(2-ethylhexyl)phthalate	94U ug/Kg	A	bl
280-7344-1	SSAJ8-03-8BPC	Bis(2-ethylhexyl)phthalate	87U ug/Kg	A	bl
280-7344-1	SSAJ8-03-10BPC**	Bis(2-ethylhexyl)phthalate	95U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-7344-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140H2a
SDG #: 280-7344-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: W

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: 9/10/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD r
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
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 = 2, 3
XVII.	Field blanks	ND	EB = 7

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	SSAJ8-03-1BPC S	11 +	MB 280-32399/1-A	21		31		
2	SSAJ8-03-3BPC D	12 −	MB 280-7344-18	22		32		
3	SSAJ8-03-3BPC_FD D	13		23		33		
4	SSAJ8-03-5BPC	14		24		34		
5	SSAJ8-03-8BPC	15		25		35		
6	SSAJ8-03-10BPC**	16		26		36		
7	EB-09102010 W	17		27		37		
8	SSAJ8-03-10BPCMS S	18		28		38		
9	SSAJ8-03-10BPCMSD	19		29		39		
10		20		30		40		

LDC #: 24140 # 29

VALIDATION FINDINGS CHECKLIST

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

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 #: 24140 Hma

VALIDATION FINDINGS CHECKLIST

Reviewer: JV
2nd Reviewer:

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 #: 24140 #2a
SDG #: Sa Cruz

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: VG
2nd Reviewer:

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: 9/21/10 **Blank analysis date:** 9/24/10
Conc. units: ug/kg Associated Samples: All S (BR)

Compound	Blank ID	Sample Identification								
5X MB	280-32399/1-A	1	2	3	4	5	6			
460 EEE	92.8	97/4	96/4	96/4	94/4	87/4	95/4			

Blank extraction date: _____ **Blank analysis date:** _____
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC#: 24140H2a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	2	3				
Bis(2-ethylhexyl)phthalate	96	96		0	≤350	

V:\FIELD DUPLICATES\24140H2a.wpd

LDC #: 24140 H2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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	9/23/2010	1,4-Dioxane	(IS1)	0.5414	0.5414	0.5467	0.5467	10.9	10.91
	MSS Y		Naphthalene	(IS2)	1.0285	1.0285	1.0303	1.0303	1.4	1.37
			Fluorene	(IS3)	1.2605	1.2605	1.2584	1.2584	4.8	4.81
			Hexachlorobenzene	(IS4)	0.2358	0.2358	0.2435	0.2435	4.3	4.29
			Bis(2-ethylhexyl)phthalate	(IS5)	see r2 calculations					
			Benzo(g,h,i)perylene	(IS6)	0.9682	0.9682	0.9416	0.9416	12.7	12.68

)nc IS/Cpd	Area cpd	Area IS
40/50	145195	214563
40/50	1121337	872181
40/50	864951	548947
40/50	268731	911902
40/50	1223088	973988
40/50	1060714	876472

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	bis(2eh)phth	Benzo(g,h,i)per
4.00	0.6894	1.0108	1.1578		r2	0.7223
10.00	0.5449	1.0504	1.1888	0.2352		0.8117
20.00	0.5423	1.0213	1.2358	0.2306		0.9185
50.00	**0.5414**	**1.0285**	**1.2605**	**0.2358**		**0.9682**
80.00	0.5180	1.0495	1.3064	0.2403		0.9819
120.00	0.5035	1.0338	1.2801	0.2533		1.0222
160.00	0.5222	1.0184	1.3121	0.2558		1.0472
200.00	0.5122	1.0298	1.3256	0.2536		1.0611
X =	0.5467	1.0303	1.2584	0.2435	0.0000	0.9416
S =	0.0596	0.0141	0.0605	0.0104	#DIV/0!	0.1194

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 # 24140 H 29

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: VG
2nd Reviewer: ✓

METHOD: GC EPA SW 846 Method 8270C

Parameter: Bis(2-eh)phthalate

Date	Column	Compound	Y area ratio	X conc ratio	X^2	
09/23/2010	Not specified	Bis(2-eh)phthalate	0.0332	0.100		0.3316
			0.1086	0.250		0.4343
			0.2795	0.500		0.5590
			0.8169	1.250		0.6535
			1.4119	2.000		0.7059
			2.1210	3.000		0.7070
			2.8427	4.000		0.7107
			3.6032	5.000		0.7206
						0.6028

Regression Output:					**Reported**
Constant			-0.07110	c =	0.059700
Std Err of Y Est			0.02132		
R Squared			0.99978	r2 =	0.993000
No. of Observations			8.00000		
Degrees of Freedom			6.00000		
X Coefficient(s)		0.732027		m =	0.700600
Std Err of Coef.		0.004399			

LDC # 24140 #2a

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	Y5105	09/24/10	1,4-Dioxane	(IS1)	0.5467	0.5259	0.5259	3.8	3.8
	MSS Y		Naphthalene	(IS2)	1.0303	1.0673	1.0673	3.6	3.6
			Fluorene	(IS3)	1.2584	1.2852	1.2852	2.1	2.1
			Hexachlorobenzene	(IS4)	0.2435	0.2502	0.2502	2.8	2.8
			Bis(2-ethylhexyl)phthalate	(IS5)	80000	81800	81793	2.2	2.2
			Benzo(g,h,i)perylene	(IS6)	0.9416	1.0304	1.0304	9.4	9.4
2									

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	211295	200892		
Naphthalene	(IS2)	40/80	1685942	789799		
Fluorene	(IS3)	40/80	1315231	511699		
Hexachlorobenzene	(IS4)	40/80	427264	853812		
Bis(2-ethylhexyl)phthalate	(IS5)	40/80	1299611	934443		
Benzo(g,h,i)perylene	(IS6)	40/80	1701263	825567		

LDC #: 24140 H29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # 6

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	79.9	80	80	0
2-Fluorobiphenyl	↓	78.0	78	78	↓
Terphenyl-d14	↓	101.4	101	101	↓
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 #: 24140 H2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: VV
2nd Reviewer: V

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: 8/09

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	2870	2850	0	2360	2310	82	82	81	81	2	2
Pentachlorophenol			↓								
Pyrene	2870	2850		2980	2800	104	102	98	98	6	6

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 #: 24150 #29

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

Reviewer: DG
2nd Reviewer: L

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

LCS/LCSD samples: MS 280-323997/2-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	2640	NA	2240	NA	85	85				
Pentachlorophenol										
Pyrene	2640		2860		108	108				

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 #: 24140 H2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. # 6 . EEE

Conc. = $\frac{(4281)(\quad)(\quad)(\quad)(\quad)(\quad)}{(865424)(\quad)(\quad)(\quad)(\quad)}$ / 0.7006 + 0.0597

=

x = 0.0668

final conc. = (0.0668)(40)(1ml)(1000 / (30.5g)(0.918)

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
			= 95.4 ug/kg		

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 1, 2010

LDC Report Date: October 25, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7047-1

Sample Identification

SSAJ2-04-10BPC
SSAJ2-04-1BPC
SSAJ2-04-5BPC
SSAI2-03-10BPC
SSAI2-03-1BPC
SSAI2-03-5BPC
SSAI2-04-10BPC**
SSAI2-04-1BPC
SSAI2-04-5BPC
SSAI2-03-1BPC_FD
EB-09012010
SSAI2-04-5BPCMS
SSAI2-04-5BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 12 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 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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.

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.

Sample EB-09012010 was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-09012010	9/1/10	Bis(2-ethyhexyl)phthalate	2.2 ug/L	All soil samples in SDG 280-7047-1

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

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for samples SSAI2-03-5BPC and SSAJ2-04-10BPC. Since the samples were diluted out, no data were qualified.

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.

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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAI2-04-5BPC	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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7047-1	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 SSAI2-03-1BPC and SSAI2-03-1BPC_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
	SSAI2-03-1BPC	SSAI2-03-1BPC_FD				
Bis(2-ethylhexyl)phthalate	300	290	-	10 (≤340)	-	-
Hexachlorobenzene	260	320	-	60 (≤340)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-7047-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7047-1	SSAI2-04-5BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-7047-1	SSAJ2-04-10BPC SSAJ2-04-1BPC SSAJ2-04-5BPC SSAI2-03-10BPC SSAI2-03-1BPC SSAI2-03-5BPC SSAI2-04-10BPC** SSAI2-04-1BPC SSAI2-04-5BPC SSAI2-03-1BPC_FD EB-09012010	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 280-7047-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-7047-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140I2a
SDG #: 280-7047-1
Laboratory: Test America

Date: 10/22/10
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: W

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: 9/01/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD
IV.	Continuing calibration/ICV	A	CCV/ICV ≤25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
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 = 5, 10
XVII.	Field blanks	SW	EB = 11

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	SSAJ2-04-10BPC S	11	EB-09012010 W	21	MB 280-30977/1-A	31		
2	SSAJ2-04-1BPC	12	SSAI2-04-5BPCMS S	22	MB 280-30058/1-A	32		
3	SSAJ2-04-5BPC	13	SSAI2-04-5BPCMSD	23		33		
4	SSAI2-03-10BPC	14		24		34		
5	SSAI2-03-1BPC D	15		25		35		
6	SSAI2-03-5BPC	16		26		36		
7	SSAI2-04-10BPC**	17		27		37		
8	SSAI2-04-1BPC	18		28		38		
9	SSAI2-04-5BPC	19		29		39		
10	SSAI2-03-1BPC_FD D	20		30		40		

LDC #: 24140 I 2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVR
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 duplicate				
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 #: 24140 I 29

VALIDATION FINDINGS CHECKLIST

Reviewer: JC
2nd Reviewer: W

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 #: 24190 I2a
SDG #: Sw Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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: 9/01/10
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All S

Compound	Blank ID	Sample Identification								
	11									
EEE	2.2	(All results > 5x EB)								
CRQL										

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC #: 29140 T 2a

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: SJ/6
2nd Reviewer: LA

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		6 (20x)	All	DO (varied)	No qual
				( )	
		1 (5x)	FBP	177 (50-120)	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
S3 (TPH) = Terphenyl-d14	18-137	33-141
S4 (PHL) = Phenol-d5	24-113	10-94
S5 (2FP)= 2-Fluorophenol	25-121	21-100
S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 24140 I 2a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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 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?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		12/13	Several compounds outside limits (for	)	%R)	( )	9	No qual (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 24180 I2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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
		9	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140I2a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: JW
2nd Reviewer:

METHOD: GC/MS SVOA (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 Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	5	10				
Bis(2-ethylhexyl)phthalate	300	290		10	≤340	
Hexachlorobenzene	260	320		60	≤340	

V:\FIELD DUPLICATES\24140I2a.wpd

LDC #: 24140 I2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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	9/13/2010	1,4-Dioxane (IS1)	0.6266	0.6266	0.6356	0.6357	6.2	6.18
	MSS B		Naphthalene (IS2)	1.0767	1.0767	1.0396	1.0396	10.0	9.98
			Fluorene (IS3)	1.3777	1.3777	1.3051	1.3051	11.6	11.56
			Hexachlorobenzene (IS4)	0.2406	0.2406	0.2343	0.2343	6.0	6.03
			Bis(2-ethylhexyl)phthalate (IS5)	0.7243	0.7243	0.6681	0.6681	9.7	9.69
			Benzo(g,h,i)perylene (IS6)	1.1315	1.1315	1.0938	1.0938	3.8	3.80

)nc IS/Cpd	Area cpd	Area IS
40/50	197471	252134
40/50	1338510	994488
40/50	983140	570870
40/50	290330	965177
40/50	963068	1063669
40/50	1493397	1055901

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	bis(2-eh)phtha	Benzo(g,h,i)per
4.00	0.7296	1.1419	1.4534	0.2371	0.5406	1.0227
10.00	0.6351	1.1290	1.4363	0.2472	0.6101	1.1141
20.00	0.6284	1.1384	1.4299	0.2521	0.6785	1.1201
50.00	**0.6266**	**1.0767**	**1.3777**	**0.2406**	**0.7243**	**1.1315**
80.00	0.6289	1.0555	1.3340	0.2401	0.7348	1.1412
120.00	0.6226	0.9806	1.2121	0.2281	0.7081	1.0957
160.00	0.6087	0.9246	1.1457	0.2180	0.6863	1.0744
200.00	0.6054	0.8701	1.0514	0.2113	0.6617	1.0506
X =	0.6357	1.0396	1.3051	0.2343	0.6681	1.0938
S =	0.0393	0.1037	0.1509	0.0141	0.0647	0.0415

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 # 24140 Inn

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: [signature]

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
Ax = Area of compound
Cx = Concentration of compound
RRF = continuing calibration RRF
Ais = Area of associated internal standard
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	B0548	09/18/10	Phenol (IS1)	0.636	0.612	0.612	3.8	3.8
			Naphthalene (IS2)	1.040	1.051	1.051	1.1	1.1
			Fluorene (IS3)	1.305	1.283	1.283	1.7	1.7
			Hexachlorobenzene (IS4)	0.234	0.233	0.233	0.7	0.7
			Bis(2-ethylhexyl)phthalate (IS5)	0.668	0.752	0.752	12.5	12.5
			Benzo(g,h,i)perylene (IS6)	1.094	1.077	1.077	1.5	1.5

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	323105	264090
Naphthalene (IS2)	40/80	2196496	1045249
Fluorene (IS3)	40/80	1570034	611700
Hexachlorobenzene (IS4)	40/80	472647	1015623
Bis(2-ethylhexyl)phthalate (IS5)	40/80	1565882	1041505
Benzo(g,h,i)perylene (IS6)	40/80	2262454	1049866

LDC #: 24140 E 29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: #7

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	75.7	76	76	9
2-Fluorobiphenyl	↓	73.7	74	74	↓
Terphenyl-d14	↓	73.4	73	73	↓
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 #: 24140 I 2a
SDG #: Sm Cmev

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: DVG
2nd Reviewer: LW

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 MS - MSD I * 2/(MS + MSD) MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 12 /13

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	2780	2780	0	2480	2240	89	89	81	81	10	10
Pentachlorophenol	↓	↓									
Pyrene	↓	↓	201	2836	2470	94	94	82	82	14	14

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 #: 24140 I 2a

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

Reviewer: JVG
2nd Reviewer: [illegible]

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

LCS/LCSD samples: LCS 280-309777/2-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	2630	NA	2670	NA	79	79				
Pentachlorophenol		↓		↓						
Pyrene	2630	↓	2740	↓	81	81				

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 #: 24140 I2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. #7 SS

Conc. = $\frac{(11\,450)(40)(1\text{ ml})(1000)(\quad)}{(95/521)(0.234)(30.7\text{g})(0.919)(\quad)}$

= 729.1

≈ 730 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 27, 2010

LDC Report Date: October 22, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6956-1

Sample Identification

BDT-1-S-15-10BPC
BDT-1-S-15-12BPC
BDT-1-S-15-14BPC**
BDT-1-S-15-2BPC
BDT-1-S-15-4BPC
BDT-1-S-15-6BPC
BDT-1-S-15-8BPC
BDT-1-S-15-2BPC_FD
BDT-1-S-10-10BPC
BDT-1-S-10-12BPC
BDT-1-S-10-14BPC**
BDT-1-S-10-2BPC
BDT-1-S-10-4BPC
BDT-1-S-10-6BPC
BDT-1-S-10-8BPC
BDT-1-S-5-10BPC
BDT-1-S-5-12BPC
BDT-1-S-5-14BPC**
BDT-1-S-5-8BPC
BDT-1-S-5-2BPC
BDT-1-S-5-4BPC
BDT-1-S-5-6BPC
BDT-1-S-10-8BPCMS
BDT-1-S-10-8BPCMSD
BDT-1-S-5-14BPCMS
BDT-1-S-5-14BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 26 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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.

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.

No field blanks were identified in this SDG.

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-1-S-5-10BPC	CLP1	Tetrachloro-m-xylene	124 (59-115)	All TCL compounds	J+ (all detects)	P
BDT-1-S-5-12BPC	CLP1	Tetrachloro-m-xylene	116 (59-115)	All TCL compounds except 4,4'-DDE	J+ (all detects)	A
BDT-1-S-5-12BPC (2X)	CLP1	Tetrachloro-m-xylene	116 (59-115)	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) and relative percent difference (RPD) were not within QC limits for several compounds, the MS, MSD, or 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) 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 a 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-1-S-10-14BPC**	Endrin ketone	153.3	J (all detects)	A
BDT-1-S-5-14BPC**	Endrin ketone 4,4'-DDT	174.3 42.8	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 280-6956-1	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-1-S-15-2BPC and BDT-1-S-15-2BPC_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-1-S-15-2BPC	BDT-1-S-15-2BPC_FD				
beta-BHC	4.3	27	-	22.7 (≤1.8)	J (all detects)	A
4,4'-DDE	1.8U	0.42	-	1.38 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6956-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6956-1	BDT-1-S-5-10BPC	All TCL compounds	J+ (all detects)	P	Surrogate recovery (%R) (s)
280-6956-1	BDT-1-S-5-12BPC	All TCL compounds except 4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6956-1	BDT-1-S-5-12BPC (2X)	4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6956-1	BDT-1-S-10-14BPC**	Endrin ketone	J (all detects)	A	Project Quantitation Limit (RPD) (dc)
280-6956-1	BDT-1-S-5-14BPC**	Endrin ketone 4,4'-DDT	J (all detects) J (all detects)	A	Project Quantitation Limit (RPD) (dc)
280-6956-1	BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6956-1	BDT-1-S-15-2BPC BDT-1-S-15-2BPC_FD	beta-BHC	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6956-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6956-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140A3a
SDG #: 280-6956-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: JVA
2nd Reviewer: MV

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: 8/30/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% rv
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
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	D = 4, 8
XV.	Field blanks	N	

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

All Soils

1	BDT-1-S-15-10BPC	8	11	BDT-1-S-10-14BPC**	8	21	BDT-1-S-5-4BPC		31	MB 280-30887/1-A	
2	BDT-1-S-15-12BPC		12	BDT-1-S-10-2BPC		22	BDT-1-S-5-6BPC		32	MB 280-30895/1-A	
3	BDT-1-S-15-14BPC**		13	BDT-1-S-10-4BPC		23	BDT-1-S-10-8BPCMS		33		
4	BDT-1-S-15-2BPC	D	14	BDT-1-S-10-6BPC		24	BDT-1-S-10-8BPCMSD		34		
5	BDT-1-S-15-4BPC		15	BDT-1-S-10-8BPC		25	BDT-1-S-5-14BPCMS		35		
6	BDT-1-S-15-6BPC		16	BDT-1-S-5-10BPC		26	BDT-1-S-5-14BPCMSD		36		
7	BDT-1-S-15-8BPC		17	BDT-1-S-5-12BPC		27			37		
8	BDT-1-S-15-2BPC_FD	D	18	BDT-1-S-5-14BPC**		28			38		
9	BDT-1-S-10-10BPC		19	BDT-1-S-5-8BPC		29			39		
10	BDT-1-S-10-12BPC		20	BDT-1-S-5-2BPC		30			40		

LDC #: 24140 A39

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: ✓

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 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 #: 24140A39 VALIDATION FINDINGS CHECKLIST Page: 2 of 2
Reviewer: JVG
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 #: 24140 A3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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

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

Y N N/A Were surrogates spiked into all samples, standards and blanks?

Y (N) N/A Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		16	CLP 1	A	124 (59-115)	J+ dets / P (all Tq) (5)
					( )	
		17			116 ( )	J+ dets / A (all except J)
					( )	
		17 (2x)	↓	↓	119 ( )	(J only)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 24140A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
[✓ Y] N N/A Was a 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 the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		25/26	Several	compounds	outside	limits ( )	18	No qual
			for	%R and %	RPD ( )	( )		(either MS, MSD
				( )	( )	( )		or LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 24140 A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

METHOD: / GC __ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?
Y N N/A Did the percent difference of detected compounds between two columns./detectors ≤40%?
If no, please see findings bellow.

#	Compound Name	Sample ID	%RPD/%D Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	Q	11	153.3	J dets /A (dc)
	Q	18	174.3	
	O		42.8	

Comments: See sample calculation verification worksheet for recalculations

LDC #: 24164D A3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVB
2nd reviewer: [signature]

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	4	8	
B	4.3	27	22.7 (≤ 1.8 D) Jdets/A (fd)
J	1.8 U	0.42	1.38 ↓ -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC # 24 140 A3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: b-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
08/11/2010	CLP1	b-BHC	23110.00	4.00		5777.50
			52056.00	10.00		5205.60
	GCS_P1		124514.00	25.00		4980.56
			245293.00	50.00		4905.86
			366609.00	75.00		4888.12
			479885.00	100.00		4798.85
					Ave RF	5092.75

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		3979.11102		
R Squared		0.99952	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	4848.652338	-1.270906	b =	4813.000000
Std Err of Coef.	28.969843	0.79		

LDC # 24140A3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: b-BHC

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	b-BHC	46113.00	4.00	16.00	11528
			103650.00	10.00	100.00	10365
	GCS_P2		239958.00	25.00	625.00	9598
			450061.00	50.00	2500.00	9001
			648617.00	75.00	5625.00	8648
			826471.00	100.00	10000.00	8265
					Ave RF	9568

Regression Output:			Reported	
Constant		9066.02542	c =	NR
Std Err of Y Est		1421.92497		
R Squared		0.99999	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	9529.795818	-13.537170	b =	NR
Std Err of Coef.	67.958350	0.65		

LDC # 24140 Ana

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVb
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	Hexachlorobenzene	44827.00	4.00		11206.75
			103588.00	10.00		10358.80
	GCS_P2		249072.00	25.00		9962.88
			490208.00	50.00		9804.16
			730674.00	75.00		9742.32
			953705.00	100.00		9537.05
					Ave RF	10101.99

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		8773.78312		
R Squared		0.99941	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	9653.526874	-1.270906	b =	9638.000000
Std Err of Coef.	63.877363	0.79		

LDC # 29190A3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	Hexachlorobenzene	93334.00	4.00	16.00	23334
			210505.00	10.00	100.00	21051
	GCS_P2		481272.00	25.00	625.00	19251
			894649.00	50.00	2500.00	17893
			1284080.00	75.00	5625.00	17121
			1628971.00	100.00	10000.00	16290
					Ave RF	19156

Regression Output:			Reported	
Constant		20708.90229	c =	NR
Std Err of Y Est		3835.69679		
R Squared		0.99998	r2 =	0.999990
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	19034.788783	-29.504222	b =	NR
Std Err of Coef.	183.320239	1.76		

LDC # 24140 A34

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVL
2nd Reviewer:

METHOD: GC ✓ HPLC ____

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

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

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	005F0501	9/15/2010 15:57	HCB CLP1	50	51.2	51.8	2.3	3.7
			b-BHC CLP1	50	53.3	54.1	6.6	8.2
			HCB CLP2	50	48.2	48.2	3.6	3.6
			b-BHC CLP2	50	50.3	50.3	0.6	0.5
2	029F2901	9/13/2010 19:34	HCB CLP1	50	52.1	52.7	4.1	5.5
			b-BHC CLP1	50	54.1	54.9	8.3	9.9
			HCB CLP2	50	49.2	49.2	1.6	1.6
			b-BHC CLP2	50	51.9	51.9	3.9	3.8
3								
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area	Area		
HCB CLP1	9638	499664	508165			
b-BHC CLP1	4813	260440	264411			

Y = a (X^2) + b X + c

Calculation

	Area Y	a	b	c	Conc. X	final conc	T = Y-c	(b^2 - 4aT)	( )^ 1/2	(-b+ ()) / 2a	(-b -())/ 2a
CCV1 HCB CLP2	869867	-29.504	19034.789	20708.902	48.214		-849158.098	262108950.2	16189.7792	48.2139678	596.945638
CCV1 b-BHC 2	453939	-13.537	9529.796	9066.025	50.272		-444872.9746	66727723.99	8168.70394	50.2723938	653.700137
CCV1 HCB CLP2	885657	-29.504	19034.789	20708.902	49.191		-864948.098	260245477.5	16132.1256	49.1910142	595.968591
CCV1 b-BHC 2	467389	-13.537	9529.796	9066.025	51.923		-458322.9746	65999424.25	8124.00297	51.9234393	652.049091

LDC #: 24140A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: #3

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	CLP 1	20	17.0	85	85	0
Tetrachloro-m-xylene	2		15.6	78	78	
Decachlorobiphenyl	1		19.4	97	97	
Decachlorobiphenyl	2		19.3	96	96	

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 #: 24140 A3a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

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 = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 23/24

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
gamma-BHC	17.1	17.3	0	15.5	15.7	91	91	91	91	1	1
4,4'-DDT	↓	↓	↓	14.9	15.9	87	87	93	93	7	7
Aroclor 1260											

Comments: Refer ot 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 #: 74140 A3A

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

Page: 1 of 1
Reviewer: JVG
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 = I LCS - LCSD I * 2/(LCS + LCSD)

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

LCS/LCSD samples: LCS 280-30887/2-A

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	NA	15.0	NA	90	90				
4,4'-DDT	↓	↓	14.6	↓	88	88				
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 #: 24140A3A

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. # 11 B:

Conc. = $\frac{(183371)(10\ ml)}{(4813.0)(30.1\ g)(0.904)}$

= 14.0 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: September 2, 2010

LDC Report Date: October 25, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7103-1

Sample Identification

SSAM5-04-10BPC**
SSAM5-04-1BPC
SSAM5-04-5BPC
SSAM5-04-5BPC_FD
SSAM5-04-1BPCMS
SSAM5-04-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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.

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 with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB 280-30951/1-A	9/10/10	Hexachlorobenzene	0.332 ug/Kg	All samples in SDG 280-7103-1

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

No field blanks were identified in this SDG.

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
SSAM5-04-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	466 (63-124) 442 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
SSAM5-04-5BPC_FD	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	165 (63-124) 161 (63-124)	All TCL compounds except Hexachlorobenzene	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) 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 280-7103-1	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 SSAM5-04-5BPC and SSAM5-04-5BPC_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
	SSAM5-04-5BPC	SSAM5-04-5BPC_FD				
4,4'-DDT	1.9U	1.1	-	0.8 (≤1.9)	-	-
Hexachlorobenzene	51	150	99 (≤50)	-	J (all detects)	A

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-7103-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7103-1	SSAM5-04-1BPC SSAM5-04-5BPC_FD	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-7103-1	SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-7103-1	SSAM5-04-5BPC SSAM5-04-5BPC_FD	Hexachlorobenzene	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140C3a
SDG #: 280-7103-1
Laboratory: Test America

Date: 10/25/10
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: W

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: 9/02/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
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	SW	D = 3, 4
XV.	Field blanks	N	

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	SSAM5-04-10BPC**	11	MB 280-30951/1-A Soil	21		31	
2	SSAM5-04-1BPC	12		22		32	
3	SSAM5-04-5BPC D	13		23		33	
4	SSAM5-04-5BPC_FD D	14		24		34	
5	SSAM5-04-1BPC MS	15		25		35	
6	↓ MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 24140 C3A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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 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 #: 24140 C39

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: W

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 #: 24140 C34
SDG #: Sc Cw

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: DM
2nd Reviewer: L

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 all samples associated with a method blank?
(Y) N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
(Y) N N/A If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies?
(Y) N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank extraction date: 9/10/10 **Blank analysis date:** 9/14/10 **Associated samples:** All
Conc. units: ug/kg

Compound	Blank ID	Sample Identification								
2X	MB 280-30957/1-A									
0.664	FF 0.332		All results > 2X MB							

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 24140 C34

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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

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

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		2	CLP 1	B	466 (63-124)	J+ dets/A (5) (qual all TCL except FF)
			2		447 (↓)	
					( )	
		2 DL (50X)	CLP 1	A	10 (59-115)	No qual
			2	↓	0 (↓)	↓
			1	B	458 (63-124)	
			2	↓	430 (↓)	
					( )	
					( )	
		4	CLP 1	B	165 (63-124)	J+ dets/A (5) (qual all TCL except FF)
			2	↓	161 ( )	
					( )	
		4DL (5.0 X)	CLP 1	B	187 ( )	No qual
			2	↓	177 (↓)	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 24140C3a
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
[✓ Y] N N/A Was a 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 the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		5/6	Several	compounds	outside)	( )	2	No qual
			limits	for %R or	%RPD)	( )		(LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 24140C3a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVb
2nd Reviewer: [signature]

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	3	4				
4,4'-DDT	1.9U	1.1		0.8	≤1.9	
Hexachlorobenzene	51	150	99			Jdet/A (fd)

V:\FIELD DUPLICATES\24140C3a.wpd

LDC # 24190 C3A

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: LA

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	Hexachlorobenzene	35416.00	4.00	16.00	8854
			79982.00	10.00	100.00	7998
	GCS_P1		186328.00	25.00	625.00	7453
			366503.00	50.00	2500.00	7330
			532247.00	75.00	5625.00	7097
			700881.00	100.00	10000.00	7009
					Ave RF	7623

Regression Output:			Reported	
Constant		6214.81624	c =	NR
Std Err of Y Est		2282.53420		
R Squared		0.99996	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	7365.983258	-4.269664	b =	NR
Std Err of Coef.	109.089622	1.05		

LDC # 24140 C3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JR
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	X Area	Y Conc	X^2	
08/11/2010	CLP2	Hexachlorobenzene	38101.00	4.00		9525.25
			87056.00	10.00		8705.60
	GCS_P1		206854.00	25.00		8274.16
			408434.00	50.00		8168.68
			593608.00	75.00		7914.77
			783179.00	100.00		7831.79
					Ave RF	8403.38

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		9097.68589		
R Squared		0.99905	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	7921.897276	-1.270906	b =	7928.000000
Std Err of Coef.	66.235531	0.79		

LDC # 24140 C3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	X Area	Y Conc	X^2	
08/11/2010	CLP1	4,4'-DDT	23760.00	4.00		5940.00
			54935.00	10.00		5493.50
	GCS_P1		129507.00	25.00		5180.28
			260822.00	50.00		5216.44
			384225.00	75.00		5123.00
			508746.00	100.00		5087.46
					Ave RF	5340.11

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		3488.48800		
R Squared		0.99967	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	5121.098272	-1.270906	b =	5090.000000
Std Err of Coef.	25.397871	0.79		

LDC #: 24140 C3a
SDG #: —

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: MV
2nd Reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081)

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)

Where
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	Reported (100 std)	Recalculated (100 std)	Reported Average CF (Initial)	Recalculated Average CF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/11/2010	4,4'-DDT (CLP2)	5271	5271	5475	5475	4.8	4.779
	GCS P1								
2									

Compound	Conc	Response cpd
ddt	100	527096

Conc	ddt
4	5948
10	5611
25	5336
50	5386
75	5298
100	5271
S =	5475
X =	262

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 # 24140C3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: DM
2nd Reviewer:

METHOD: GC ✓ HPLC____

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

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

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	005F0501	9/13/2010 18:41	HCB CLP1	50	48.7	48.7	2.6	2.6
			DDT CLP1	50	51.6	52.3	3.2	4.6
			HCB CLP2	50	49.2	50.1	1.5	0.1
			DDT CLP2	50	48.5	48.5	3.1	3.1
2								
3								
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope/CF	Area	Area			
HCB CLP2	7928	396891				
DDT CLP1	5090	266199				
DDT CLP2	5475	265266				

Y = a (X^2) + b X + c

Calculation

	Area Y	a	b	c	Conc. X	final conc	T = Y-c	(b^2 - 4aT)	( )^ 1/2	(-b+ ()) / 2a	(-b -())/ 2a
CCV1 HCB CLP1	354691	-4.270	7365.983	6214.816	48.683		-348476.1838	48306204.49	6950.2665	48.6826075	1676.50777
SSAM5-04-10BPC	524745	-4.270	7365.983	6214.816	73.529		-518530.1838	45401910.72	6738.094	73.5291185	1651.66126

LDC #: 24140C3a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: # 1

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	clp1	20	15.7	79	79	0
Tetrachloro-m-xylene	2		15.9	79	79	
Decachlorobiphenyl	1 2		21.9	109	109	
Decachlorobiphenyl			2396	120	120	

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 #: 24140 (3a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

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 = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5/6

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
gamma-BHC	18.3	18.3	0	15.2	16.9	83	83	93	93	10	11
4,4'-DDT	↓	↓	4.6	18.1	21.4	73	74	92	92	17	17
Aroclor 1260											

Comments: Refer ot 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 #: 24140C3K

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

Page: 1 of 1
Reviewer: JVG
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 = I LCS - LCSD I * 2/(LCS + LCSD)

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

LCS/LCSD samples: LCS 280 – 3095/

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	16.1	NA	15.1	NA	94	94				
4,4'-DDT	↓	↓	13.0	↓	81	81				
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 #: 24140 C 39

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
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?

Example:

Sample I.D. #1 FF

$y = ax^2 + bx + c$

Conc. = $\frac{(524745) = -4.27X^2 + 7365.78X + 6214.8}{(\quad)}$

$X = 73.529$

final conc. = $\frac{(73.529)(10\,ml)}{(31.0g)(0.899)}$

$= 26.4$

$\approx$ 26 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: September 1, 2010

LDC Report Date: October 25, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7047-1

Sample Identification

SSAI2-03-1BPC
SSAI2-03-5BPC
SSAI2-04-1BPC
SSAI2-04-5BPC**
SSAI2-03-1BPC_FD
EB-09012010
SSAI2-04-5BPCMS
SSAI2-04-5BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 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.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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
9/14/10	053F5301	CLP1	4,4'-DDD	24.9	All water samples in SDG 280-7047-1	J+ (all detects)	A
9/14/10	053F5301	CLP2	4,4'-DDD	26.2	All water samples in SDG 280-7047-1	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 with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB 280-31016/1-A	9/15/10	Hexachlorobenzene Methoxychlor	0.602 ug/Kg 0.528 ug/Kg	All soil samples in SDG 280-7047-1

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

Sample EB-09012010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-09012010	9/1/10	Hexachlorobenzene	0.13 ug/L	All soil samples in SDG 280-7047-1

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

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
SSAI2-03-1BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	48 (59-115) 58 (59-115) 395 (63-124) 624 (63-124)	Aldrin alpha-Chlordane Chlordane (Technical) delta-BHC Endosulfan I Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A
SSAI2-03-1BPC	CLP1 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	57 (59-115) 573 (63-124) 1021 (63-124)	4,4'-DDD	J (all detects) UJ (all non-detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAI2-03-5BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	0 (59-115) 0 (59-115) 0 (63-124) 625 (63-124)	4,4'-DDD Aldrin alpha-Chlordane delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-BHC gamma-Chlordane Heptachlor Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A
SSAI2-04-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	582 (63-124) 617 (63-124)	Aldrin alpha-BHC alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A
SSAI2-04-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	598 (63-124) 582 (63-124)	4,4'-DDD Endrin ketone	J+ (all detects) J+ (all detects)	A
SSAI2-04-5BPC**	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	0 (59-115) 4878 (59-115) 50440 (63-124) 304961 (63-124)	4,4'-DDD Aldrin alpha-Chlordane beta-BHC Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAI2-03-1BPC_FD	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	805 (63-124) 2454 (63-124)	Aldrin alpha-BHC alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A
SSAI2-03-1BPC_FD	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	493 (63-124) 613 (63-124)	4,4-DDD	J+ (all detects)	A
MB 280-31016/1-A	CLP1	Decachlorobiphenyl	156 (63-124)	All TCL compounds	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.

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
SSAI2-04-5BPC**	Hexachlorobenzene gamma-BHC 4,4'-DDE Endosulfan II 4,4'-DDT	177.3 47.3 84.7 198.3 105.8	J (all detects) 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 280-7047-1	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 SSAI2-03-1BPC and SSAI2-03-1BPC_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
	SSAI2-03-1BPC	SSAI2-03-1BPC_FD				
4,4'-DDE	660	220	100 (≤50)	-	J (all detects)	A
4,4'-DDT	210	100	71 (≤50)	-	J (all detects)	A
alpha-BHC	130	30	125 (≤50)	-	J (all detects)	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI2-03-1BPC	SSAI2-03-1BPC_FD				
beta-BHC	200	100	67 (≤50)	-	J (all detects)	A
Dieldrin	13	1.2	-	11.8 (≤35)	-	-
Endosulfan I	1.8U	0.53	-	1.27 (≤1.8)	-	-
Endosulfan II	29	7.5	-	21.5 (≤35)	-	-
gamma-BHC	53	12	-	41 (≤35)	J (all detects)	A
Hexachlorobenzene	350	210	50 (≤50)	-	-	-
delta-BHC	3.7	1.1	-	2.6 (≤1.8)	J (all detects)	A
Endrin ketone	9.2	1.8U	-	7.4 (≤1.8)	J (all detects) UJ (all non-detects)	A
Methoxychlor	26	24	8 (≤50)	-	-	-
4,4'-DDD	6.1	6.0	-	0.1 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-7047-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7047-1	EB-09012010	4,4'-DDD	J+ (all detects)	A	Continuing calibration (%D) (c)
280-7047-1	SSAI2-03-1BPC	Aldrin alpha-Chlordane Chlordane (Technical) delta-BHC Endosulfan I Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene 4,4'-DDD	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-7047-1	SSAI2-03-5BPC	4,4'-DDD Aldrin alpha-Chlordane delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-BHC gamma-Chlordane Heptachlor Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-7047-1	SSAI2-04-1BPC	Aldrin alpha-BHC alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene 4,4'-DDD Endrin ketone	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Surrogate recovery (%R) (s)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-7047-1	SSAI2-04-5BPC**	4,4'-DDD Aldrin alpha-Chlordane beta-BHC Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-7047-1	SSAI2-03-1BPC_FD	Aldrin alpha-BHC alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde Endrin ketone gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide Methoxychlor Toxaphene 4,4-DDD	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Surrogate recovery (%R) (s)
280-7047-1	SSAI2-04-5BPC**	Hexachlorobenzene gamma-BHC 4,4'-DDE Endosulfan II 4,4'-DDT	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Project Quantitation Limit (RPD) (dc)
280-7047-1	SSAI2-03-1BPC SSAI2-03-5BPC SSAI2-04-1BPC SSAI2-04-5BPC** SSAI2-03-1BPC_FD EB-09012010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-7047-1	SSAI2-03-1BPC SSAI2-03-1BPC_FD	4,4'-DDE 4,4'-DDT alpha-BHC beta-BHC	J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
280-7047-1	SSAI2-03-1BPC SSAI2-03-1BPC_FD	gamma-BHC delta-BHC	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)
280-7047-1	SSAI2-03-1BPC SSAI2-03-1BPC_FD	Endrin ketone	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-7047-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-7047-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140I3a
SDG #: 280-7047-1
Laboratory: Test America

Date: 10/22/10
Page: 1 of 1
Reviewer: SVG
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: 9/01 1/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	% RSD ≤ 20 % ✓
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 20 %
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
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	D = 1, 5
XV.	Field blanks	SW	EB = 6

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	SSAI2-03-1BPC D S	+ 11	MB 280-31016/1-A	21		31	
2	SSAI2-03-5BPC	- 12 ✓	MB 280-30492/1-A	22		32	
3	SSAI2-04-1BPC	13		23		33	
4	SSAI2-04-5BPC**	14		24		34	
5	SSAI2-03-1BPC_FD D	15		25		35	
6 ✓	EB-09012010 W	16		26		36	
7	SSAI2-04-5BPCMS S	17		27		37	
8	SSAI2-04-5BPCMSD	18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 24140 I 34

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
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 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 #: 24140 I3a

VALIDATION FINDINGS CHECKLIST

Reviewer: JW
2nd Reviewer:

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 #: 24140 I3a

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

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

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) / relative percent difference (RPD) criteria 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
	9/14/10	053F5301	CLP 1	M (+)	24.9	( )	6, MB 280-30492/1-A	J+ dets/A (c)
			↓ 2	M (+)	26.2	( )	↓	↓
						( )		
						( )		
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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. DB 608
DD. DB 1701
EE. Hexachlobenzene
FF.________
GG.________
HH.________
II.________
JJ.________

LDC #: 24 140 I39
SDG #: —

VALIDATION FINDINGS WORKSHEET
Blanks

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

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 all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank extraction date: 9/16/10 **Blank analysis date:** 9/15/10 **Associated samples:** All S
Conc. units: ug/Kg

Compound	Blank ID	Sample Identification								
	MB 280-31016/1-A									
FF	0.602		(All results either ND or > 2X Blk)							
P	0.528									

2X
1.204
1.056

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 24140 I 3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: DVG
2nd Reviewer: C

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

Y N N/A Field blanks were 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: 9/01/10

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All S

2X
0.26

Compound	Blank ID	Sample Identification								
	6									
FF	0.13	(All	results	> 2X	EB)					
CRQL										

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

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

LDC #: 24140 I3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 3
Reviewer: JG
2nd Reviewer:

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

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

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		1	CLP 1	A	48 (59-115)	J/UJ /A (qual F,S,HH,C,H,N,K,R,Q,T,E,G,P,U) (S)
			2	A	58 (↓)	
			1	B	395 (63-124)	
			2	B	624 (↓)	
					( )	
		1RE	1	A	57 (59-115)	(qual M) (S)
			1	B	573 (63-124)	
			2	B	1021 (↓)	
					( )	
		1DL (20x)	1	A	54 (59-115)	No qual
			2	A	30 (↓)	
			1	B	403 (63-124)	
			2	B	933 (↓)	
					( )	
		2	1	A	0 (59-115)	J/UJ /A (qual M,F,S,C,I,H,L,N,K,R,Q,D,T,E,P,U) (S)
			2	A	0 (↓)	
			1	B	0 (63-124)	
			2	B	625 (↓)	
					( )	(Matrix interference)
					( )	

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

LDC #: 24140 I3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 2 of 3
Reviewer: JVC
2nd Reviewer:

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

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

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		2 (1000x)	CLP 1	A	0 (59-115)	No qual
			2	A	0 ( )	
			1	B	2183 (63-124)	
			2	B	4088 ( )	
					( )	
		3	1	B	582 ( )	J+ dets /A (qual F, A, S, HH, C, I, H, L, N, K, R, D, T, E, G, P, U) (S)
			2	B	617 ( )	
					( )	
					( )	
		3 RE	1	B	598 ( )	J+ dets /A (qual M, Q) (S)
			2	B	582 ( )	
					( )	
		3 DL (20x)	1	A	44 (59-115)	No qual
			2	A	39 ( )	
			1	B	630 (63-124)	
			2	B	647 ( )	
					( )	
		4	1	A	0 (59-115)	J/UJ /A (qual M, F, S, B, HH, C, I, H, N, K, R, Q, T, E, G, P, U)
			2	A	4878 ( )	
			1	B	50440 (63-124)	
			2	B	304961 ( )	

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

LDC #: 24140 I3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JW
2nd Reviewer: [signature]

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

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

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		4DL (5000x)	CLP 1	A	0 (59-115)	No qual
			✓	A	0 (↓)	↓
			1	B	74560 (63-124)	
			✓	B	86025 (↓)	↓
					( )	
		5	1	B	805 ( )	J+ dets /A (qual F, A, S, HH, C, I, H, L, N, K, R, Q, D, T, E, G, P, U) (S)
			2	↓	2454 ( )	↓
					( )	
		5 RE	1	B	493 ( )	(qual M) (S)
			✓	↓	613 ( )	↓
					( )	
		5 DL (10x)	1	B	483 ( )	No qual
			✓	↓	627 (↓)	↓
					( )	
		MB 280-31016/1-A	1	B	156 (63-124)	J+ dets /P (all TCL)
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 24140I3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: DG
2nd Reviewer:

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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
[✓ Y] N N/A Was a 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 the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		7/8	All	compounds out	side limits	( )	4	No qual
			for	%R ( )	( )	( )		(LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 24140 I3a
SDG #: [illegible]
METHOD: __ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: [illegible]

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

Level IV/D Only

(Y) N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
(Y) N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?
Y (N) N/A Did the percent difference of detected compounds between two columns./detectors ≤40%?
If no, please see findings bellow.

#	Compound Name	Sample ID	%RPD/%D Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	FF	4	177.3	J dets A (dc)
	D		47.3	
	J		84.7	
	L		198.3	
	O		105.8	

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24140l3a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JV6
2nd Reviewer:

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	1	5				
4,4'-DDE	660	220	100			Jdet/A (fd)
4,4'-DDT	210	100	71			Jdet/A (fd)
alpha-BHC	130	30	125			Jdet/A (fd)
beta-BHC	200	100	67			Jdet/A (fd)
Dieldrin	13	1.2		11.8	≤35	
Endosulfan I	1.8U	0.53		1.27	≤1.8	
Endosulfan II	29	7.5		21.5	≤35	
gamma-BHC	53	12		41	≤35	Jdet/A (fd)
Hexachlorobenzene	350	210	50			
delta-BHC	3.7	1.1		2.6	≤1.8	Jdet/A (fd)
Endrin ketone	9.2	1.8U		7.4	≤1.8	JUT Jdet/A (fd)
Methoxychlor	26	24	8			
4,4'-DDD	6.1	6.0		0.1	≤1.8	

LDC # 24146 T3w

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	Hexachlorobenzene	44827.00	4.00		11206.75
			103588.00	10.00		10358.80
	GCS_P2		249072.00	25.00		9962.88
			490208.00	50.00		9804.16
			730674.00	75.00		9742.32
			953705.00	100.00		9537.05
					Ave RF	10101.99

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		8773.78312		
R Squared		0.99941	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	9653.526874	-1.270906	b =	9638.000000
Std Err of Coef.	63.877363	0.79		

LDC # 24140 E3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVb
2nd Reviewer: VN

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	Hexachlorobenzene	93334.00	4.00	16.00	23334
			210505.00	10.00	100.00	21051
	GCS_P2		481272.00	25.00	625.00	19251
			894649.00	50.00	2500.00	17893
			1284080.00	75.00	5625.00	17121
			1628971.00	100.00	10000.00	16290

Ave RF 19156

Regression Output:			Reported	
Constant		20708.90229	c =	NR
Std Err of Y Est		3835.69679		
R Squared		0.99998	r2 =	0.999990
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	19034.788783	-29.504222	b =	NR
Std Err of Coef.	183.320239	1.76		

LDC # 24140 I3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: W

METHOD: GC EPA SW 846 Method 8081A

Parameter: b-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
08/11/2010	CLP1	b-BHC	23110.00	4.00		5777.50
			52056.00	10.00		5205.60
	GCS_P2		124514.00	25.00		4980.56
			245293.00	50.00		4905.86
			366609.00	75.00		4888.12
			479885.00	100.00		4798.85
					Ave RF	5092.75

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		3979.11102		
R Squared		0.99952	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	4848.652338	-1.270906	b =	4813.000000
Std Err of Coef.	28.969843	0.79		

LDC # 24196 I7a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SVC
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: b-BHC

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	b-BHC	46113.00	4.00	16.00	11528
			103650.00	10.00	100.00	10365
	GCS_P2		239958.00	25.00	625.00	9598
			450061.00	50.00	2500.00	9001
			648617.00	75.00	5625.00	8648
			826471.00	100.00	10000.00	8265

Ave RF 9568

Regression Output:			Reported	
Constant		9066.02542	c =	NR
Std Err of Y Est		1421.92497		
R Squared		0.99999	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	9529.795818	-13.537170	b =	NR
Std Err of Coef.	67.958350	0.65		

LDC # 24140 I 39

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JG
2nd Reviewer:

METHOD: GC ✓ HPLC____

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

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

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	020F2001	9/14/2010 20:36	HCB CLP1	50	51.4	52.1	2.8	4.2
			b-BHC CLP1	50	53.6	54.4	7.2	8.8
			HCB CLP2	50	48.5	48.5	3.0	3.0
			b-BHC CLP2	50	51.7	51.7	3.4	3.4
2								
3								
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area	Area		
HCB CLP1	9638	502028				
b-BHC CLP1	4813	261834				

Y = a (X^2) + b X + c

Calculation

	Area Y	a	b	c	Conc. X	final conc	T = Y-c	(b^2 - 4aT)	( )^ 1/2	(-b+ ()) / 2a	(-b -())/ 2a
CCV1 HCB CLP2	874817	-29.504	19034.789	20708.902	48.520		-854108.098	261524771	16171.7275	48.5198868	596.639719
CCV1 b-BHC 2	465529	-13.537	9529.796	9066.025	51.695		-456462.9746	66100140.79	8130.19931	51.6945754	652.277955

LDC #: 24140F3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	CLP 1	20	0	0	0 ~~NC~~	NC
Tetrachloro-m-xylene	2		975.5	4878	4875	0
Decachlorobiphenyl	1		10088	50440 ~~487~~	50440	
Decachlorobiphenyl	2		60992.2	304961	304961	

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 #: 24140 I3a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

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 = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 7/8

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
gamma-BHC	17.9	17.7	137.9	214	231	719	425	823	525	8	8
4,4'-DDT	↓	↓	720	1150	1170	-6599	240✓	-6571	2542.4	1	✓
Aroclor 1260											

Comments: Refer ot 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.

Lab used result from Col. 2 of the parent sample instead of Col. 1

LDC #: 24160 I3<

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

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

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 = I LCS - LCSD I * 2/(LCS + LCSD)

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

LCS/LCSD samples: LCS 280-31016/2-A

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	16.4	NA	13.957	NA	84	84				
4,4'-DDT	↓	↓	12.053	↓	73	73				
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 #: 24140 I3a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
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?

Example:

Sample I.D. #4 FF:

Conc. = $\frac{(717660)(10\text{ml})(5000)}{(9638)(30.4\text{g})(0.92)}$

= 132974.6

≈ 130000 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 30, 2010

LDC Report Date: October 21, 2010

Matrix: Soil/Water

Parameters: Arsenic & Lead

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6956-1

Sample Identification

BDT-1-S-15-10BPC
BDT-1-S-15-12BPC
BDT-1-S-15-14BPC**
BDT-1-S-15-2BPC
BDT-1-S-15-4BPC
BDT-1-S-15-6BPC
BDT-1-S-15-8BPC
BDT-1-S-15-2BPC_FD
SA33-1BPC
SA33-2BPC
SA33-3BPC
SSAQ5-03-10BPC**
SSAQ5-03-1BPC
SSAQ5-03-5BPC
SA33-3BPC_FD
BDT-1-S-10-10BPC
BDT-1-S-10-12BPC
BDT-1-S-10-14BPC**
BDT-1-S-10-2BPC
BDT-1-S-10-4BPC
BDT-1-S-10-6BPC
BDT-1-S-10-8BPC
BDT-1-S-5-10BPC
BDT-1-S-5-12BPC
BDT-1-S-5-14BPC**
BDT-1-S-5-8BPC
BDT-1-S-5-2BPC
BDT-1-S-5-4BPC
BDT-1-S-5-6BPC
EB-08302010
SSAQ5-03-1BPCMS
SSAQ5-03-1BPCMSD
BDT-1-S-10-8BPCMS
BDT-1-S-10-8BPCMSD
BDT-1-S-5-14BPCMS
BDT-1-S-5-14BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 35 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 6020 for Arsenic and Lead.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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 lead was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Lead	0.0206 mg/Kg	BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC

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

Sample EB-08032010 was identified as an equipment blank. No arsenic or lead was found in this blank.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
BDT-1-S-10-8BPCMS/MSD (BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC)	Lead	-	56 (75-125)	-	J- (all detects) UJ (all non-detects)	A
BDT-1-S-5-14BPCMS/MSD (BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC)	Lead	66 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

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) and relative percent differences (RPD) 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 with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
BDT-1-S-10-8BPCL	Arsenic	12 (≤10)	SA33-1BPC SA33-2BPC SA33-3BPC SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC SA33-3BPC_FD	J (all detects) UJ (all non-detects)	A

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 280-6956-1	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-1-S-15-2BPC and BDT-1-S-15-2BPC_FD and samples SA33-3BPC and SA33-3BPC_FD were identified as field duplicates. No arsenic or lead was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-S-15-2BPC	BDT-1-S-15-2BPC_FD				
Lead	6.6	6.9	4 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-3BPC	SA33-3BPC_FD				
Arsenic	2.0	2.6	26 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Lead - Data Qualification Summary - SDG 280-6956-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6956-1	BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC	Lead	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-6956-1	SA33-1BPC SA33-2BPC SA33-3BPC SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC SA33-3BPC_FD	Arsenic	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
280-6956-1	BDT-1-S-15-10BPC BDT-1-S-15-12BPC BDT-1-S-15-14BPC** BDT-1-S-15-2BPC BDT-1-S-15-4BPC BDT-1-S-15-6BPC BDT-1-S-15-8BPC BDT-1-S-15-2BPC_FD SA33-1BPC SA33-2BPC SA33-3BPC SSAQ5-03-10BPC** SSAQ5-03-1BPC SSAQ5-03-5BPC SA33-3BPC_FD BDT-1-S-10-10BPC BDT-1-S-10-12BPC BDT-1-S-10-14BPC** BDT-1-S-10-2BPC BDT-1-S-10-4BPC BDT-1-S-10-6BPC BDT-1-S-10-8BPC BDT-1-S-5-10BPC BDT-1-S-5-12BPC BDT-1-S-5-14BPC** BDT-1-S-5-8BPC BDT-1-S-5-2BPC BDT-1-S-5-4BPC BDT-1-S-5-6BPC EB-08302010	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Lead - Laboratory Blank Data Qualification Summary - SDG 280-6956-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Lead – Equipment Blank Data Qualification Summary - SDG 280-6956-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140A4
SDG #: 280-6956-1
Laboratory: Test America

Date: 10-2010
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: As & Pb (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: 8/30/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/D
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(7,8), (11,15)
XV	Field Blanks	ND	EB=30, ~~FB=FB040620 10-RZB, FB-041320 10-RIGF~~ RZE (280-21371-2), (280-21400-2)

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

all soil except 30 = water

1	BDT-1-S-15-10BPC	11	SA33-3BPC	21	BDT-1-S-10-6BPC	31	SSAQ5-03-1BPCMS
2	BDT-1-S-15-12BPC	12	SSAQ5-03-10BPC**	22	BDT-1-S-10-8BPC	32	SSAQ5-03-1BPCMSD
3	BDT-1-S-15-14BPC**	13	SSAQ5-03-1BPC	23	BDT-1-S-5-10BPC	33	BDT-1-S-10-8BPCMS
4	BDT-1-S-15-2BPC	14	SSAQ5-03-5BPC	24	BDT-1-S-5-12BPC	34	BDT-1-S-10-8BPCMSD
5	BDT-1-S-15-4BPC	15	SA33-3BPC_FD	25	BDT-1-S-5-14BPC**	35	BDT-1-S-5-14BPCMS
6	BDT-1-S-15-6BPC	16	BDT-1-S-10-10BPC	26	BDT-1-S-5-8BPC	36	BDT-1-S-5-14BPCMSD
7	BDT-1-S-15-8BPC	17	BDT-1-S-10-12BPC	27	BDT-1-S-5-2BPC	37	
8	BDT-1-S-15-2BPC_FD	18	BDT-1-S-10-14BPC**	28	BDT-1-S-5-4BPC	38	PBS1
9	SA33-1BPC	19	BDT-1-S-10-2BPC	29	BDT-1-S-5-6BPC	39	PBS2
10	SA33-2BPC	20	BDT-1-S-10-4BPC	30	EB-08302010	40	PBW

Notes: _____

LDC #: 24140A4

VALIDATION FINDINGS CHECKLIST

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

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 #: 24140A4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8,16-29		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^-, ___
9-15,30		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^-, ___
~~16-29~~ CR		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:31,32		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^-, ___
33,34		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^-, ___
35,36		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 #: 24140A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: QR
2nd Reviewer: VC

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100 x 5xdil
Sample Concentration units, unless otherwise noted: Associated Samples: 16-29

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Pb	0.0206													

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 #: 24140T4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: QR
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 Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	33/34	S	Pb		71		1-8, 16-29	J- (UJ/A (m)
	35/36	S	Pb	66			1-8, 16-29	↓

Comments:

LDC #: 24140A1

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SR
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 If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		22	S	As	12	9-15	J/UJ/A (sd)

Comments:

LDC 24140A4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: ✓

METHOD: Metals (EPA Method 6020/6010/7000)

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

Analyte	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Lead	6.6	6.9	4			

V:\FIELD DUPLICATES\FD_inorganic\24140A4.wpd

Analyte	Concentration (mg/Kg) 11	Concentration (mg/Kg) 15	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.0	2.6	26			

LDC #: 24140AS

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)
1	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	AS	41.5	40	104	104	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 22:28	ICP/MS (Continuing calibration)	Pb	48.7	50	97	97	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 #: 24140A5

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SR
2nd Reviewer: L

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	103 ug/L	100 ug/L	103	103	Y
LCS	Laboratory control sample	As	19.3	20	97	97	
31	Matrix spike	As	(SSR-SR) 18.3	20	92	92	
33/34	Duplicate	Pb	24.4	21.1 ~~19.2~~	15	14	
22	ICP serial dilution	Pb	7.4	8.01	8.2	7.9	

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 #: 24140A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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 Pb 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:

$$\frac{(100mL)\left(\frac{12.97\ ug/L}{1000}\right)(5)}{(1.08g)(0.92)} = 6.527\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	3	Pb	6.5	6.5	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	August 31, 2010
LDC Report Date:	October 28, 2010
Matrix:	Soil
Parameters:	Arsenic
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-6983-1

Sample Identification

SSAR7-05-1BPC
SSAR7-05-2BPC
SSAR7-05-3BPC
SSAQ5-07-1BPC
SSAQ5-07-5BPC
SSAQ5-07-10BPC**
SSAR7-05-1BPCMS
SSAR7-05-1BPCMSD
SSAQ5-07-1BPCMS
SSAQ5-07-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 10 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 6020 for Arsenic.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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 was found in the initial, continuing and preparation blanks.

No field blanks were identified 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 280-6983-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-6983-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6983-1	SSAR7-05-1BPC SSAR7-05-2BPC SSAR7-05-3BPC SSAQ5-07-1BPC SSAQ5-07-5BPC SSAQ5-07-10BPC**	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-6983-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Field Blank Data Qualification Summary - SDG 280-6983-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140B4
SDG #: 280-6983-1
Laboratory: Test America

Date: 10-20-16
Page: 1 of 1
Reviewer: dz
2nd Reviewer: lw

METHOD: As (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: 8-31-10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
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	N	
XV	Field Blanks N	ND	~~FB=FB040620 10 RZB(2802131-2)~~ CR

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

1	SSAR7-05-1BPC	11		21	PBS	31	
2	SSAR7-05-2BPC	12		22		32	
3	SSAR7-05-3BPC	13		23		33	
4	SSAQ5-07-1BPC	14		24		34	
5	SSAQ5-07-5BPC	15		25		35	
6	SSAQ5-07-10BPC**	16		26		36	
7	SSAR7-05-1BPCMS	17		27		37	
8	SSAR7-05-1BPCMSD	18		28		38	
9	SSAQ5-07-1BPCMS	19		29		39	
10	SSAQ5-07-1BPCMSD	20		30		40	

Notes: _____

LDC #: 24114B34

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

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 #: 24404B4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 3
Reviewer: CR
2nd Reviewer: [signature]

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 #: 24140B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	AS	41.3	40	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	AS	50.4	500	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 #: 24140B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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/kg	True / D / SDR (~~units~~) ug/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	102 ug/L	100 ug/L	102	107	Y
LCS	Laboratory control sample		19.9	20	100	100	
7	Matrix spike		(SSR-SR) 15.3	19.4	79	78	
9/10	Duplicate		23.0	21.4	7	7	
1	ICP serial dilution		25	25.1	0.4	0.53	

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 #: 24460B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: AR
2nd reviewer: V

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:

$$\frac{(100mL)(5)\left(\frac{6.54ug/L}{1000}\right)}{(1.135)(0.934)} = 3.098\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	6	As	3.1	3.1	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 2 through September 3, 2010

LDC Report Date: October 21, 2010

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7103-1

Sample Identification

SSAO2-01-1BPC
SSAO2-01-2BPC
SSAO2-01-3BPC
SSAP3-04-10BPC**
SSAP3-04-1BPC
SSAP3-04-5BPC
SSAP3-03-10BPC
SSAP3-03-1BPC
SSAP3-03-5BPC
SSAP3-02-1BPC
SSAP3-02-2BPC
SSAP3-02-3BPC
SSAN2-02-1BPC
SSAN2-02-2BPC
SSAN2-02-3BPC
SSAP3-04-5BPC_FD
SSAM7-06-1BPC
SSAM7-06-2BPC
SSAM7-06-3BPC
SSAN7-05-1BPC
SSAN7-05-2BPC
SSAN7-05-3BPC
SSAN7-05-1BPC_FD
SSAM5-04-10BPC**
SSAM5-04-1BPC
SSAM5-04-5BPC
SSAM5-04-5BPC_FD
SSAL8-03-1BPC
SSAL8-03-3BPC
SSAK8-08-1BPC
SSAK8-8-3BPC**
SSAK8-08-3BPC_FD
SSAN7-04-1BPC
SSAN7-04-2BPC
SSAN7-04-3BPC
SSAM7-07-1BPC
SSAM7-07-2BPC
SSAM7-07-3BPC**
SSAM7-07-3BPC_FD
EB-09022010
EB-09032010
EB-09032010MS
EB-09032010MSD
SSAO2-01-3BPCMS
SSAO2-01-3BPCMSD
SSAM7-06-3BPCMS
SSAM7-06-3BPCMSD
SSAM7-07-3BPC_FDMS
SSAM7-07-3BPC_FDMSD
EB-09022010MS
EB-09022010MSD
SSAP3-04-5BPC_FDMS
SSAP3-04-5BPC_FDMSD
SSAP3-03-1BPCMS
SSAP3-03-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 49 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Manganese, Magnesium, and Lead.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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)	Manganese	0.0770 mg/Kg	SSAO2-01-1BPC SSAO2-01-2BPC SSAO2-01-3BPC SSAP3-02-2BPC SSAP3-02-3BPC SSAN2-02-1BPC SSAN2-02-2BPC SSAN2-02-3BPC
PB (prep blank)	Manganese	0.276 mg/Kg	SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD
ICB/CCB	Manganese	0.420 ug/L	SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD
PB (prep blank)	Magnesium	4.91 mg/Kg	SSAP3-04-5BPC_FD
PB (prep blank)	Magnesium	0.657 mg/Kg	SSAP3-04-10BPC** SSAP3-04-1BPC SSAP3-04-5BPC SSAP3-03-10BPC SSAP3-03-1BPC SSAP3-03-5BPC

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	5.00 ug/L	SSAP3-03-1BPC SSAP3-03-5BPC SSAP3-04-5BPC_FD
ICB/CCB	Magnesium	2.30 ug/L	SSAP3-04-10BPC** SSAP3-04-1BPC SSAP3-04-5BPC SSAP3-03-10BPC

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

Samples EB-09022010 and EB-09032010 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-09032010	9/3/10	Manganese	2.4 ug/L	SSAO2-01-1BPC SSAO2-01-2BPC SSAO2-01-3BPC SSAN2-02-1BPC SSAN2-02-2BPC SSAN2-02-3BPC

Sample concentrations were compared to concentrations detected in the equipment 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 280-7103-1	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 SSAP3-04-5BPC and SSAP3-04-5BPC_FD, samples SSAN7-05-1BPC and SSAN7-05-1BPC_FD, samples SSAM5-04-5BPC and SSAM5-04-5BPC_FD, samples SSAK8-08-3BPC and SSAK8-08-3BPC_FD, and samples SSAM7-07-3BPC and SSAM7-07-3BPC_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
	SSAP3-04-5BPC	SSAP3-04-5BPC_FD				
Magnesium	8300	11000	28 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN7-05-1BPC	SSAN7-05-1BPC_FD				
Arsenic	24	20	18 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM5-04-5BPC	SSAM5-04-5BPC_FD				
Arsenic	3.6	3.9	8 (≤50)	-	-	-
Lead	7.0	7.5	7 (≤50)	-	-	-
Manganese	290	360	22 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAK8-08-3BPC	SSAK8-08-3BPC_FD				
Arsenic	3.2	3.0	6 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM7-07-3BPC	SSAM7-07-3BPC_FD				
Arsenic	20	22	10 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Data Qualification Summary - SDG 280-7103-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7103-1	SSAO2-01-1BPC SSAO2-01-2BPC SSAO2-01-3BPC SSAP3-04-10BPC** SSAP3-04-1BPC SSAP3-04-5BPC SSAP3-03-10BPC SSAP3-03-1BPC SSAP3-03-5BPC SSAP3-02-1BPC SSAP3-02-2BPC SSAP3-02-3BPC SSAN2-02-1BPC SSAN2-02-2BPC SSAN2-02-3BPC SSAP3-04-5BPC_FD SSAM7-06-1BPC SSAM7-06-2BPC SSAM7-06-3BPC SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-3BPC SSAN7-05-1BPC_FD SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD SSAL8-03-1BPC SSAL8-03-3BPC SSAK8-08-1BPC SSAK8-8-3BPC** SSAK8-08-3BPC_FD SSAN7-04-1BPC SSAN7-04-2BPC SSAN7-04-3BPC SSAM7-07-1BPC SSAM7-07-2BPC SSAM7-07-3BPC** SSAM7-07-3BPC_FD EB-09022010 EB-09032010	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 280-7103-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals – Equipment Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140C4
SDG #: 280-7103-1
Laboratory: Test America

Date: 6-20-10
Page: 1 of 2
Reviewer: CR
2nd Reviewer:

METHOD: (As, Mn, Mg & Pb) (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: 9/2-3/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW 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	(6,16), (20,23), (26,27), (31,32), (38,39)
XV	Field Blanks	SW	~~EB-40,41, see below for FBs~~ CR

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	SSAO2-01-1BPC S	11	SSAP3-02-2BPC S	21	SSAN7-05-2BPC S	31	SSAK8-8-3BPC** S
2	SSAO2-01-2BPC	12	SSAP3-02-3BPC	22	SSAN7-05-3BPC	32	SSAK8-08-3BPC_FD
3	SSAO2-01-3BPC	13	SSAN2-02-1BPC	23	SSAN7-05-1BPC_FD	33	SSAN7-04-1BPC
4	SSAP3-04-10BPC**	14	SSAN2-02-2BPC	24	SSAM5-04-10BPC**	34	SSAN7-04-2BPC
5	SSAP3-04-1BPC	15	SSAN2-02-3BPC	25	SSAM5-04-1BPC	35	SSAN7-04-3BPC
6	SSAP3-04-5BPC	16	SSAP3-04-5BPC_FD	26	SSAM5-04-5BPC	36	SSAM7-07-1BPC
7	SSAP3-03-10BPC	17	SSAM7-06-1BPC	27	SSAM5-04-5BPC_FD	37	SSAM7-07-2BPC
8	SSAP3-03-1BPC	18	SSAM7-06-2BPC	28	SSAL8-03-1BPC	38	SSAM7-07-3BPC**
9	SSAP3-03-5BPC	19	SSAM7-06-3BPC	29	SSAL8-03-3BPC	39	SSAM7-07-3BPC_FD
10	SSAP3-02-1BPC	20	SSAN7-05-1BPC	30	SSAK8-08-1BPC	40	EB-09022010
						41	EB-09032010

Notes: ~~FB = FB-040710-RZC (280-2280-2) CR~~
~~= FB-040710-RZD (280-2216-2) CR~~
~~= FB-041310-RIG2-RZE (280-2400-2) CR~~

PBS1794 1
PBS2674 2
PBS1862(Mn) 3
PBS1857 4
PBS 5

LDC #: 24140C4
SDG #: 280-7103-1
Laboratory: Test America

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 10/20/10
Page: 2 of 3
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: As, Mn, Mg & Pb (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		Sampling dates:
II.	ICP/MS Tune		
III.	Calibration		
IV.	Blanks		
V.	ICP Interference Check Sample (ICS) Analysis		
VI.	Matrix Spike Analysis		
VII.	Duplicate Sample Analysis		
VIII.	Laboratory Control Samples (LCS)		
IX.	Internal Standard (ICP-MS)		
X.	Furnace Atomic Absorption QC		
XI.	ICP Serial Dilution		
XII.	Sample Result Verification		Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data		
XIV.	Field Duplicates		
XV	Field Blanks		

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

42	EB-09032010MS W	52	SSAP3-04-5BPC_FDMS S				
43	EB-09032010MSD	53	SSAP3-04-5BPC_FDMSD				
44	SSAO2-01-3BPCMS S	54	SSAP3-03-1BPCMS				
45	SSAO2-01-3BPCMSD	55	SSAP3-03-1BPCMSD				
46	SSAM7-06-3BPCMS						
47	SSAM7-06-3BPCMSD						
48	SSAM7-07-3BPC_FDMS						
49	SSAM7-07-3BPC_FDMSD						
50	EB-09022010MS W						
51	EB-09022010MSD						

Notes: _____

LDC #: 24140C4

VALIDATION FINDINGS CHECKLIST

Reviewer: AR
2nd Reviewer: W

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 #: 24440C4

VALIDATION FINDINGS CHECKLIST

Reviewer: cE
2nd Reviewer: LW

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 #: 24140B4 C

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3,13-15,41		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^-,
4-9,16		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^-,
10-12,17-23,28-40		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^-,
24-27		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:42,43		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^-,
44,45		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^-,
46,47		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^-,
48,49		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^-,
50,51		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^-,
52,53		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^-,
54,55		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 #: 24140C4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CSL
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100 x 5xdil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-3, 11-15

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.0770													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 24-27

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.276		0.420	2.76										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 16

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mg	4.91			49.1										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-9

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mg	0.657													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8, 9, 16

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mg			5.00											

LDC #: 24140C4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg

Soil preparation factor applied: 100 x 5xdil
Associated Samples: 4-7

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mg			2.30											

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 #: 24140C4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

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 Reason: be

Sampling date: 9/3/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 1-3, 13-15

Analyte	Blank ID	Sample Identification										
	41	Action Level	No Qualifiers									
Mn	2.4	2.4										

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 24140C4 **VALIDATION FINDINGS WORKSHEET** Page: 1 of 1
SDG#: See Cover **Field Duplicates** Reviewer: CV
2nd Reviewer: V

METHOD: Metals (EPA Method 6020/6010/7000)

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

Analyte	Concentration (mg/Kg) 6	16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Magnesium	8300	11000	28			

V:\FIELD DUPLICATES\FD_inorganic\24140C4.wpd

Analyte	Concentration (mg/Kg) 20	23	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	24	20	18			

Analyte	Concentration (mg/Kg) 26	27	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.6	3.9	8			
Lead	7.0	7.5	7			
Manganese	290	360	22			

Analyte	Concentration (mg/Kg) 31	32	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.2	3.0	6			

Analyte	Concentration (mg/Kg) 38	39	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	20	22	10			

LDC #: 24140C4

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)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	As	41.2	40.0	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Pb	50.8	50	102	102	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 #: 24140C4

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~~) mg/kg	True / D / SDR (~~units~~) mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	105 ug/L	100 ug/L	105	105	Y
LCS	Laboratory control sample	As	40.4	40.0	101	101	
44	Matrix spike	As	(SSR-SR) 18.3	19.7	93	93	
44/45	Duplicate	Mn	386	354	9	9	
3	ICP serial dilution	Mn	350	353	0.86	0.83	

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 #: 24140C4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: AR
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 Pb 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:

$$\frac{(100mL)(5)(13.49mg/L/1000)}{(1.04g)(0.899)} = 7.214 mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	24	As	3.8	3.8	Y
		Pb	7.2	7.2	↓
		Mn	290	290	↓

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 7, 2010
LDC Report Date:	October 20, 2010
Matrix:	Soil
Parameters:	Metals
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7117-1

Sample Identification

SSAN8-06-0BPC
SSAN8-05-0BPC
SSAN7-06-0BPC
SSAN7-07-0BPC
SSAN8-03-0BPC
SSAN8-04-0BPC
SSAN8-07-0BPC
SSAN8-07-0BPC_FD
SSAN8-05-0BPCMS
SSAN8-05-0BPCMSD
SSAN7-06-0BPCMS
SSAN7-06-0BPCMSD

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, 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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. 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 metals 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 Lead	0.103 mg/Kg 0.0807 mg/Kg	SSAN8-06-0BPC SSAN7-06-0BPC SSAN7-07-0BPC SSAN8-03-0BPC SSAN8-04-0BPC SSAN8-07-0BPC SSAN8-07-0BPC_FD
ICB/CCB	Cobalt	0.440 ug/L	SSAN8-06-0BPC SSAN7-06-0BPC SSAN7-07-0BPC SSAN8-03-0BPC SSAN8-04-0BPC SSAN8-07-0BPC SSAN8-07-0BPC_FD
PB (prep blank)	Manganese Lead	0.208 mg/Kg 0.0871 mg/Kg	SSAN8-05-0BPC
ICB/CCB	Cobalt	0.0401 ug/L	SSAN8-05-0BPC

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

Sample EB-09072010 (from SDG 280-7183-1) was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-09072010	9/7/10	Manganese	18 ug/L	All sample sin SDG 280-7117-1

Sample concentrations were compared to concentrations detected in the equipment 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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAN8-05-0BPCMS/MSD (SSAN8-05-0BPC)	Lead	-	56 (75-125)	-	J- (all detects) UJ (all non-detects)	A

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7117-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAN8-07-0BPC and SSAN8-07-0BPC_FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN8-07-0BPC	SSAN8-07-0BPC_FD				
Arsenic	10	13	26 (≤50)	-	-	-
Cobalt	26	36	32 (≤50)	-	-	-
Lead	83	130	44 (≤50)	-	-	-
Manganese	3800	5600	38 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Data Qualification Summary - SDG 280-7117-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7117-1	SSAN7-06-0BPC	Lead	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-7117-1	SSAN8-06-0BPC SSAN8-05-0BPC SSAN7-06-0BPC SSAN7-07-0BPC SSAN8-03-0BPC SSAN8-04-0BPC SSAN8-07-0BPC SSAN8-07-0BPC_FD	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 280-7117-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG 280-7117-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24140D4
SDG #: 280-7117-1
Laboratory: Test America

Date: 10/2010
Page: 1 of 1
Reviewer: CR
2nd Reviewer: M

METHOD: (As, Co, Pb, & 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: 9/7/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	~~A~~ SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	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	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(7,8)
XV	Field Blanks SWAT	SW	~~FB= FB-01072010 RZC (280-22802-2)~~ CR EB= EB-09072010 CS06 (280-7183-1)

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: SO1

1	SSAN8-06-0BPC	11	SSAN7-06-0BPCMS	21	PBS (1,3-8)	31	
2	SSAN8-05-0BPC	12	SSAN7-06-0BPCMSD	22	PBS (2)	32	
3	SSAN7-06-0BPC	13		23		33	
4	SSAN7-07-0BPC	14		24		34	
5	SSAN8-03-0BPC	15		25		35	
6	SSAN8-04-0BPC	16		26		36	
7	SSAN8-07-0BPC	17		27		37	
8	SSAN8-07-0BPC_FD	18		28		38	
9	SSAN8-05-0BPCMS	19		29		39	
10	SSAN8-05-0BPCMSD	20		30		40	

Notes:

LDC #: 24140D4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer:
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8		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:9-12		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 #: 24140D4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100 x 5xdil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1, 3-8

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.440											
Mn	0.103													
Pb	0.0807													

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 2

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.0401											
Mn	0.208													
Pb	0.0871													

LDC #: 24140D4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

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 Reason: be

Sampling date: 9/7/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-09072010	Action Level	No Qualifiers									
Mn	18	18										

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 #: 24140D4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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 Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	9/10	S	Pb		56		~~1,2,4-8 or~~ 2	J-/UJ/A (M)

Comments:

MSD.4SW

LDC 24140D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CC
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010/7000)

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

V:\FIELD DUPLICATES\FD_inorganic\24140D4.wpd

Analyte	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	7	8				
Arsenic	10	13	26			
Cobalt	26	36	32			
Lead	83	130	44			
Manganese	3800	5600	38			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 7, 2010

LDC Report Date: October 21, 2010

Matrix: Soil/Water

Parameters: Arsenic & Manganese

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7183-1

Sample Identification

SSAP5-01-1BPC	EB-09072010
SSAP5-01-2BPC	SSAP5-01-1BPCMS
SSAP5-01-3BPC	SSAP5-01-1BPCMSD
SSAP5-02-1BPC	
SSAP5-02-2BPC	
SSAP5-02-3BPC	
SSAP6-01-1BPC	
SSAP6-01-2BPC**	
SSAP6-01-3BPC	
SSAP6-01-3BPC_FD	
SSAP6-02-10BPC**	
SSAP6-02-1BPC	
SSAP6-02-5BPC	
SSAP6-03-10BPC	
SSAP6-03-1BPC	
SSAP6-03-5BPC	
SSAP7-03-10BPC**	
SSAP7-03-1BPC	
SSAP7-03-5BPC	
SSAP6-02-1BPC_FD	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 22 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 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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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 was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.0591 mg/Kg	SSAP5-01-1BPC SSAP5-01-2BPC SSAP5-01-3BPC SSAP6-02-10BPC** SSAP6-02-1BPC SSAP6-02-5BPC SSAP6-03-10BPC SSAP6-03-1BPC SSAP6-03-5BPC SSAP7-03-10BPC** SSAP7-03-1BPC SSAP7-03-5BPC SSAP6-02-1BPC_FD

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

Sample EB-09072010 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-09072010	9/7/10	Manganese	18 ug/L	SSAP5-01-1BPC SSAP5-01-2BPC SSAP5-01-3BPC SSAP6-02-10BPC** SSAP6-02-1BPC SSAP6-02-5BPC SSAP6-03-10BPC SSAP6-03-1BPC SSAP6-03-5BPC SSAP7-03-10BPC** SSAP7-03-1BPC SSAP7-03-5BPC SSAP6-02-1BPC_FD

Sample concentrations were compared to concentrations detected in the equipment 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) and relative percent differences (RPD) 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 280-7183-1	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 SSAP6-01-3BPC and SSAP6-01-3BPC_FD and samples SSAP6-02-1BPC and SSAP6-02-1BPC_FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAP6-01-3BPC_FD	SSAP6-01-3BPC_FD				
Arsenic	3.1	3.4	9 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAP6-02-1BPC	SSAP6-02-1BPC_FD				
Arsenic	4.1	3.2	25 (≤50)	-	-	-
Manganese	320	300	6 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Data Qualification Summary - SDG 280-7183-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7183-1	SSAP5-01-1BPC SSAP5-01-2BPC SSAP5-01-3BPC SSAP5-02-1BPC SSAP5-02-2BPC SSAP5-02-3BPC SSAP6-01-1BPC SSAP6-01-2BPC** SSAP6-01-3BPC SSAP6-01-3BPC_FD SSAP6-02-10BPC** SSAP6-02-1BPC SSAP6-02-5BPC SSAP6-03-10BPC SSAP6-03-1BPC SSAP6-03-5BPC SSAP7-03-10BPC** SSAP7-03-1BPC SSAP7-03-5BPC SSAP6-02-1BPC_FD EB-09072010	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-7183-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese – Equipment Blank Data Qualification Summary - SDG 280-7183-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140E4
SDG #: 280-7183-1
Laboratory: Test America

Date: 6-20-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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: 9/7/10
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
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	(9,10),(12,20)
XV	Field Blanks	SW	EB-21

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

all soil except 21 = water

1	SSAP5-01-1BPC	11	SSAP6-02-10BPC**	21	EB-09072010	31	PBW
2	SSAP5-01-2BPC	12	SSAP6-02-1BPC	22	SSAP5-01-1BPCMS	32	PBS 582
3	SSAP5-01-3BPC	13	SSAP6-02-5BPC	23	SSAP5-01-1BPCMSD	33	
4	SSAP5-02-1BPC	14	SSAP6-03-10BPC	24		34	
5	SSAP5-02-2BPC	15	SSAP6-03-1BPC	25		35	
6	SSAP5-02-3BPC	16	SSAP6-03-5BPC	26		36	
7	SSAP6-01-1BPC	17	SSAP7-03-10BPC**	27		37	
8	SSAP6-01-2BPC**	18	SSAP7-03-1BPC	28		38	
9	SSAP6-01-3BPC	19	SSAP7-03-5BPC	29		39	
10	SSAP6-01-3BPC_FD	20	SSAP6-02-1BPC_FD	30		40	

Notes:

LDC #: 24140E9

VALIDATION FINDINGS CHECKLIST

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

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 #: 24140E4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		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^-, ____
4-10		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^-, ____
11-21		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 #: 24140E4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CR
2nd Reviewer: M

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg
Soil preparation factor applied: 100 x 5xdil
Associated Samples: 1-3, 11-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn	0.0591													

LDC #: 24140E4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

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 Reason: be

Sampling date: 9/7/10 Soil factor applied 100x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-3, 11-20

Analyte	Blank ID	Sample Identification										
	21	Action Level	No Qualifiers									
Mn	18	18										

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 24140E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010/7000)

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

V:\FIELD DUPLICATES\FD_inorganic\24140E4.wpd

Analyte	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	9	10				
Arsenic	3.1	3.4	9			

Analyte	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	20				
Arsenic	4.1	3.2	25			
Manganese	320	300	6			

LDC #: 24146E9

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Mn	41.0	400	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV (05:12)	ICP/MS (Continuing calibration)	As	49.5	50	99	99	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 #: 24140E9

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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	100 mg/L	100 mg/L	100	100	Y
LCS	Laboratory control sample	As	19.1	20	96	96	
22	Matrix spike	As	(SSR-SR) 18.2	19	96	96	
22/23	Duplicate	Mn	339	325	4	4	
1	ICP serial dilution	Mn	380	386	1.6	1.7	

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 #: 24140S4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
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 = (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:

$$\frac{(100mL)(5)(0.915)(0.00061 mg/L)}{(1.18g)(0.915)} = 3.06 mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	8	As	3.1	3.1	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 8, 2010
LDC Report Date:	October 28, 2010
Matrix:	Soil
Parameters:	Metals
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7229-1

Sample Identification

SSAO8-04-0BPC
SSAO8-07-0BPC
SSAO7-04-0BPC
SSAO8-04-0BPCMS
SSAO8-04-0BPCMSD

Introduction

This data review covers 5 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, 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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. 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 metals 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	0.0642 mg/Kg	All samples in SDG 280-7229-1
ICB/CCB	Cobalt	0.0222 ug/L	All samples in SDG 280-7229-1

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

No field blanks were identified in this SDG.

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. Results were within QC limits.

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7229-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

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
Metals - Data Qualification Summary - SDG 280-7229-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7229-1	SSAO8-04-0BPC SSAO8-07-0BPC SSAO7-04-0BPC	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 280-7229-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG 280-7229-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24140F4
SDG #: 280-7229-1
Laboratory: Test America

Date: 10/2010
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: (As, Co, Pb, & Mn) (EPA SW 846 Method 6020) — metals

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-8-10
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	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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: Soil

1	SSAO8-04-0BPC	11	PBS	21		31	
2	SSAO8-07-0BPC	12		22		32	
3	SSAO7-04-0BPC	13		23		33	
4	SSAO8-04-0BPCMS	14		24		34	
5	SSAO8-04-0BPCMSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 24140F4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		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:4,5		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 #: 24140F4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CR
2nd Reviewer: [illegible]

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

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.0222											
Mn	0.0642													

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 10, 2010
LDC Report Date:	October 28, 2010
Matrix:	Soil
Parameters:	Metals
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7342-1

Sample Identification

SSAO7-08-0BPC
SSAO7-07-0BPC**
SSAO8-12-0BPC
SSAO8-09-0BPC
SSAO8-06-0BPC
SSAO8-12-0BPC_FD
SSAO7-07-0BPCMS
SSAO7-07-0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, 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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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)	Manganese	0.717 mg/Kg	All samples in SDG 280-7342-1
ICB/CCB	Cobalt	0.0221 ug/L	All samples in SDG 280-7342-1
ICB/CCB	Manganese	0.338 ug/L	SSAO8-09-0BPC SSAO8-06-0BPC SSAO8-12-0BPC_FD

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

No field blanks were identified in this SDG.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAO7-07-0BPCMS/MSD (All samples in SDG 280-7342-1)	Lead	131 (75-125)	-	-	J+ (all detects)	A

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 280-7342-1	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 SSAO8-12-0BPC and SSAO8-12-0BPC_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
	SSAO8-12-0BPC	SSAO8-12-0BPC_FD				
Arsenic	4.0	4.3	7 (≤50)	-	-	-
Cobalt	29	26	11 (≤50)	-	-	-
Lead	8.0	7.6	5 (≤50)	-	-	-
Manganese	2100	2100	0 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Data Qualification Summary - SDG 280-7342-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7342-1	SSAO7-08-0BPC SSAO7-07-0BPC** SSAO8-12-0BPC SSAO8-09-0BPC SSAO8-06-0BPC SSAO8-12-0BPC_FD	Lead	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-7342-1	SSAO7-08-0BPC SSAO7-07-0BPC** SSAO8-12-0BPC SSAO8-09-0BPC SSAO8-06-0BPC SSAO8-12-0BPC_FD	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 280-7342-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals – Equipment Blank Data Qualification Summary - SDG 280-7342-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140G4
SDG #: 280-7342-1
Laboratory: Test America

Date: 10-20-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: (As, Co, Pb, & 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: 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	SW	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	(3,6)
XV	Field Blanks	N	

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	SSAO7-08-0BPC	11	PBS	21		31	
2	SSAO7-07-0BPC**	12		22		32	
3	SSAO8-12-0BPC	13		23		33	
4	SSAO8-09-0BPC	14		24		34	
5	SSAO8-06-0BPC	15		25		35	
6	SSAO8-12-0BPC_FD	16		26		36	
7	SSAO7-07-0BPCMS	17		27		37	
8	SSAO7-07-0BPCMSD	18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 2914064

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.	✓			
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 #: 2414064

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6		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:7,8		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 #: 24140G4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

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

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

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.0221											
Mn	0.717			7.17										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 4-6

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn			0.338											

LDC #: 24140G4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: L

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 Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of (75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y (N) N/A Were all duplicate sample relative percent differences (RPD) (≤ 20)% ~~for water samples and ≤35~~% for soil samples?

~~**LEVEL IV ONLY:**~~

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	7/8	S	Pb		131		All	J+det/A (m)
			Mn			48	↓	No Qual (LCS in)

Comments:

MSD.4SW

LDC 24140G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010/7000)

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

V:\FIELD DUPLICATES\FD_inorganic\24140G4.wpd

Analyte	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	3	6				
Arsenic	4.0	4.3	7			
Cobalt	29	26	11			
Lead	8.0	7.6	5			
Manganese	2100	2100	0			

LDC #: 24146C4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

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)	Co	40.7	40.0	102	102	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV(12:46)	ICP/MS (Continuing calibration)	Pb	5.1	50	102	102	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 #: 24140G4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer:

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	101 ug/L	100 ug/L	101	101	Y
LCS	Laboratory control sample	Co	19.6	20	98	98	
7	Matrix spike	Pb	(SSR-SR) 21.3	20.4	104	104	
7/8	Duplicate	As	26.4	25.6	3	3	
2	ICP serial dilution	Mn	31000	31700	2.3	1.2	

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 #: 24140G4

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 CG 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:

$$\frac{(100mL)(5)\left(\frac{564.3\mu g}{1000}\right)}{(0.981)(1g)} = 287.6\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	2	As	8.1	8.1	Y
		Co	290	290	↓
		Pb	20	20	
		Mn	31000	31000	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Collection Date:	September 10, 2010
LDC Report Date:	October 28, 2010
Matrix:	Soil
Parameters:	Arsenic
Validation Level:	Stage 2B
Laboratory:	TestAmerica, Inc.
Sample Delivery Group (SDG):	280-7344-1

Sample Identification

SSAO5-06-1_01_BPC
SSAO5-06-1-01_BPC-FD
SSAO5-06-5_01_BPC

Introduction

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

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. 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 was found in the initial, continuing and preparation blanks.

No field blanks were identified 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

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

VII. Duplicate Sample Analysis

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.

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-7344-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAO5-06-1_01_BPC and SSAO5-06-1_01_BPC-FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAO5-06-1_01_BPC	SSAO5-06-1_01_BPC-FD				
Arsenic	2.1	2.7	-	0.6 (≤0.6)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-7344-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7344-1	SSAO5-06-1_01_BPC SSAO5-06-1-01_BPC-FD SSAO5-06-5_01_BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-7344-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Field Blank Data Qualification Summary - SDG 280-7344-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24140H4
SDG #: 280-7344-1
Laboratory: Test America

Date: 10-20-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: As (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: 9-10-10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N	Client specified
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	N	Not performed
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2)
XV	Field Blanks	N	

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: SO; 1

1	SSAO5-06-1_01_BPC	11	PBS	21		31	
2	SSAO5-06-1-01_BPC-FD	12		22		32	
3	SSAO5-06-5_01_BPC	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: _____

LDC 24140H4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CE
2nd Reviewer: MC

METHOD: Metals (EPA Method 6020/6010/7000)

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

V:\FIELD DUPLICATES\FD_inorganic\24140H4.wpd

Analyte	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	1	2				
Arsenic	2.1	2.7		0.6	(≤0.6)	

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 2, 2010

LDC Report Date: October 26, 2010

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-7103-1

Sample Identification

SSAM7-06-1BPC
SSAM7-06-2BPC
SSAM7-06-3BPC
SSAN7-05-1BPC
SSAN7-05-2BPC
SSAN7-05-3BPC
SSAN7-05-1BPC_FD
SSAM5-04-10BPC**
SSAM5-04-1BPC
SSAM5-04-5BPC
SSAM5-04-5BPC_FD
SSAN7-04-1BPC
SSAN7-04-2BPC
SSAN7-04-3BPC
SSAM7-07-1BPC
SSAM7-07-2BPC
SSAM7-07-3BPC**
SSAM7-07-3BPC_FD
EB-09022010
SSAM7-06-3BPCMS
SSAM7-06-3BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 20 soil samples and 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.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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 perchlorate was found in the initial, continuing and preparation blanks.

Sample EB-09022010 was identified as an equipment blank. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 280-7103-1	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

Samples SSAN7-05-1BPC and SSAN7-05-1BPC_FD, samples SSAM5-04-5BPC and SSAM5-04-5BPC_FD, and samples SSAM7-07-3BPC** and SSAM7-07-3BPC_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAN7-05-1BPC	SSAN7-05-1BPC_FD				
Perchlorate	3.5	3.8	8 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM5-04-5BPC	SSAM5-04-5BPC_FD				
Perchlorate	120	110	8 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAM7-07-3BPC**	SSAM7-07-3BPC_FD				
Perchlorate	5.8	5.3	9 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Data Qualification Summary - SDG 280-7103-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-7103-1	SSAM7-06-1BPC SSAM7-06-2BPC SSAM7-06-3BPC SSAN7-05-1BPC SSAN7-05-2BPC SSAN7-05-3BPC SSAN7-05-1BPC_FD SSAM5-04-10BPC** SSAM5-04-1BPC SSAM5-04-5BPC SSAM5-04-5BPC_FD SSAN7-04-1BPC SSAN7-04-2BPC SSAN7-04-3BPC SSAM7-07-1BPC SSAM7-07-2BPC SSAM7-07-3BPC** SSAM7-07-3BPC_FD EB-09022010	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 280-7103-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-7103-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24140C6
SDG #: 280-7103-1
Laboratory: Test America

Date: 10/20/10
Page: 1 of 1
Reviewer: CR
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: 9/2/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	N	
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	SW	(4,7),(10,11),(17,18)
X	Field blanks	ND	EB=19, ~~FB=FB-04132010-RIG2-RZE~~ ~~(280-2400-2)~~ CR CR

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

all soil except 19=water

1	SSAM7-06-1BPC	11	SSAM5-04-5BPC_FD	21	SSAM7-06-3-BPCMSD		PBS
2	SSAM7-06-2BPC	12	SSAN7-04-1BPC	22		32	PBW
3	SSAM7-06-3BPC	13	SSAN7-04-2BPC	23		33	
4	SSAN7-05-1BPC	14	SSAN7-04-3BPC	24		34	
5	SSAN7-05-2BPC	15	SSAM7-07-1BPC	25		35	
6	SSAN7-05-3BPC	16	SSAM7-07-2BPC	26		36	
7	SSAN7-05-1BPC_FD	17	SSAM7-07-3BPC**	27		37	
8	SSAM5-04-10BPC**	18	SSAM7-07-3BPC_FD	28		38	
9	SSAM5-04-1BPC	19	EB-09022010	29		39	
10	SSAM5-04-5BPC	20	SSAM7-06-3-BPCMS	30		40	

Notes:

LDC #: 24140C4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: LA

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?			✓	

LDC #: 24140C4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: VW

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#: 24140C6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: QR
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg) 4	7	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	3.5	3.8	8			

V:\FIELD DUPLICATES\FD_inorganic\24140C6.wpd

Analyte	Concentration (mg/Kg) 10	11	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	120	110	9			

Analyte	Concentration (mg/Kg) 17	18	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	5.8	5.3	9			

LDC #: 24180C6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated.Calibration date: 9/1/10

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)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1	0.00348	*0.999552*	0.999157	Y
		s2	2.5	0.00708			
		s3	5	0.01			
		s4	10	0.03			
		s5	20	0.06			
		s6	40	0.13			
Calibration verification		ICV	20	Found(ug/L) 19,723	99	—	
Calibration verification		CCV	30	32,773	109	—	
Calibration verification		↓	10	10,662	107	—	↓

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 #: 24140C4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (~~units~~ mg/kg)	True / D (~~units~~ mg/kg)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO_4	0.0184	0.01	98	98	Y
20	Matrix spike sample	↓	(SSR-SR) 0.61	0.557	110	108	↓
20/21	Duplicate sample	↓	1.17	1.16	0.9	0.5	↓

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 #: 24404

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

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

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

Concentration = $\frac{(Area\ F315.164)+0.3555)(DF)(161)}{(Wt)(\%\ Solid)}$

Recalculation: $\frac{(0.05592(F315.164)+0.3555)(1000)(100mL)}{(0.899)(10.2g)(1000)} = 196\ mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	8	ClO_4	200	200	Y

Note: