LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

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

October 28, 2010

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

Dear Ms. Arnold,

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

LDC Project # 24047:

SDG #	Fraction
280-6345-1	Metals

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

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

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

October 25, 2010

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

Dear Ms. Arnold,

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

LDC Project # 24047:

SDG #	Fraction
280-6345-1	Semivolatiles

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

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

October 19, 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 September 30, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24047:

SDG #	Fraction
280-2280-10, 280-6223-1 280-6290-2, 280-6290-3 280-6345-1/ITH1781 280-6535-1, 280-6583-1 280-6639-1, 280-6674-1 280-6741-1, 280-6783-1 280-6818-1,280-6851-1 280-6886-1	Semivolatiles, Chlorinated Pesticides, Metals, Wet Chemistry

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

- Standard Operating Procedures (SOP) 40, Data Review/Validation, BRC 2009
- Quality Assurance Project Plan Tronox LLC Facility, Henderson Nevada, June 2009
- NDEP Guidance, May 2006
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\TronoxNG\PCS\24047COV.wpd

EDD Stage 2B/4

LDC #24047 (Tronox LLC-Northgate, Henderson NV / Tronox PCS Additional Sampling)

LDC	SDG#	DATE REC'D	(3) DATE DUE	SVOA (8270C)		Pest. (8081A)		Metals (SW846)		As (6020)		Pb (6020)		Mn (6020)		CLO_4 (314.0)		Cr(VI) (7199)		Chlorate (9056A)																	
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	280-2280-10	09/30/10	10/21/10	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-	-	-														
B	280-6223-1	09/30/10	10/21/10	1	25	1	15	-	-	1	19	-	-	-	-	1	19	-	-	-	-														
B	280-6223-1	09/30/10	10/21/10	0	3	0	2	-	-	0	2	-	-	-	-	0	2	-	-	-	-														
C	280-6290-2	09/30/10	10/21/10	-	-	-	-	-	-	0	3	-	-	-	-	-	-	-	-	-	-														
D	280-6290-3	09/30/10	10/21/10	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-	-	-														
E	280-6345-1/ITH1781	09/30/10	10/21/10	0	17	0	14	0	2	0	12	-	-	-	-	0	21	0	1	0	2														
E	280-6345-1/ITH1781	09/30/10	10/21/10	0	2	0	2	0	1	0	2	-	-	-	-	0	3	0	1	0	1														
F	280-6535-1	09/30/10	10/21/10	0	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
F	280-6535-1	09/30/10	10/21/10	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
G	280-6583-1	09/30/10	10/21/10	0	1	0	14	-	-	0	14	-	-	0	14	-	-	-	-	-	-														
G	280-6583-1	09/30/10	10/21/10	0	1	0	2	-	-	0	2	-	-	0	2	-	-	-	-	-	-														
H	280-6639-1	09/30/10	10/21/10	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
I	280-6674-1	09/30/10	10/21/10	1	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
I	280-6674-1	09/30/10	10/21/10	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
J	280-6741-1	09/30/10	10/21/10	1	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
J	280-6741-1	09/30/10	10/21/10	0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
K	280-6783-1	09/30/10	10/21/10	0	17	1	17	-	-	1	17	-	-	1	17	-	-	-	-	-	-														
K	280-6783-1	09/30/10	10/21/10	0	2	0	2	-	-	0	2	-	-	0	2	-	-	-	-	-	-														
L	280-6818-1	09/30/10	10/21/10	1	28	0	1	-	-	1	28	-	-	-	-	-	-	-	-	-	-														
L	280-6818-1	09/30/10	10/21/10	0	3	0	0	-	-	0	3	-	-	-	-	-	-	-	-	-	-														
M	280-6851-1	09/30/10	10/21/10	1	28	0	1	-	-	1	27	-	-	-	-	-	-	-	-	-	-														
M	280-6851-1	09/30/10	10/21/10	0	4	0	0	-	-	0	4	-	-	-	-	-	-	-	-	-	-														
N	280-6886-1	09/30/10	10/21/10	1	36	1	36	-	-	-	-	1	36	-	-	-	-	-	-	-	-														
N	280-6886-1	09/30/10	10/21/10	0	3	0	3	-	-	-	-	0	3	-	-	-	-	-	-	-	-														
Total	T/LR			6	251	3	109	0	3	4	137	1	39	1	35	1	45	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	640

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 #: 24047
SDG #: 280-2280-10, 280-6223-1, 280-6290-2, 281-6290-3, 280-6345-1/ITH1781
280-6535-1, 280-6583-1, 280-6639-1, 280-6674-1, 280-6741-1
280-6783-1, 280-6818-1, 280-6851-1, 280-6886-1

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_LDC24047_101910.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Data Validation Reports
LDC #24047

Semivolatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 7 through August 9, 2010

LDC Report Date: October 14, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6223-1

Sample Identification

SSAJ3-02-12BPC
SSAJ3-02-15BPC
SSAJ3-02-16BPC
SSAJ3-02-19BPC**
SSAJ3-02-8BPC**
SSAJ3-02-8BPC_FD
EB-08072010
SSAI3-03-23BPC
SSAI3-03-25BPC
SSAI3-04-11BPC
SSAI3-04-14BPC
SSAI3-04-14BPC_FD
SSAI3-04-15BPC
SSAI3-04-23BPC
SSAI3-04-25BPC
SSAI3-02-11BPC
SSAI3-02-14BPC
SSAI3-02-15BPC
SSAI3-02-19BPC
SSAI3-02-25BPC
SSAI3-02-5BPC_FD
SSAI3-03-11BPC
SSAI3-03-14BPC
SSAI3-02-5BPC
SSAI3-02-8BPC
SSAI3-03-5BPC**
SSAI3-03-8BPC
SSAI3-04-5BPC
SSAI3-04-8BPC
SSAI3-02-5BPC_FDMS
SSAI3-02-5BPC_FDMSD
SSAI3-03-8BPCMS
SSAI3-03-8BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 32 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 280-26583/1-A	8/12/10	Dimethylphthalate	35.3 ug/Kg	SSAJ3-02-12BPC SSAJ3-02-15BPC SSAJ3-02-16BPC SSAJ3-02-19BPC** SSAJ3-02-8BPC** SSAJ3-02-8BPC_FD SSAI3-03-23BPC SSAI3-03-25BPC SSAI3-04-11BPC SSAI3-04-14BPC SSAI3-04-14BPC_FD SSAI3-04-15BPC SSAI3-04-23BPC SSAI3-04-25BPC SSAI3-02-11BPC SSAI3-02-14BPC SSAI3-02-15BPC SSAI3-02-19BPC SSAI3-02-25BPC SSAI3-02-5BPC_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
SSAJ3-02-16BPC	Dimethylphthalate	43 ug/Kg	43U ug/Kg
SSAJ3-02-8BPC**	Dimethylphthalate	25 ug/Kg	25U ug/Kg
SSAI3-04-14BPC_FD	Dimethylphthalate	29 ug/Kg	29U ug/Kg
SSAI3-04-23BPC	Dimethylphthalate	30 ug/Kg	30U ug/Kg
SSAI3-02-25BPC	Dimethylphthalate	34 ug/Kg	34U ug/Kg

Sample EB-08072010 was identified as an equipment blank. No semivolatile contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6223-1	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 SSAJ3-02-8BPC** and SSAJ3-02-8BPC_FD, samples SSAI3-04-14BPC and SSAI3-04-14BPC_FD, and samples SSAI3-02-5BPC and SSAI3-02-5BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-02-8BPC**	SSAJ3-02-8BPC_FD				
Dimethylphthalate	25	340U	-	315 (≤340)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-04-14BPC	SSAI3-04-14BPC_FD				
Dimethylphthalate	340U	29	-	311 (≤340)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6223-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6223-1	SSAJ3-02-12BPC SSAJ3-02-15BPC SSAJ3-02-16BPC SSAJ3-02-19BPC** SSAJ3-02-8BPC** SSAJ3-02-8BPC_FD EB-08072010 SSAI3-03-23BPC SSAI3-03-25BPC SSAI3-04-11BPC SSAI3-04-14BPC SSAI3-04-14BPC_FD SSAI3-04-15BPC SSAI3-04-23BPC SSAI3-04-25BPC SSAI3-02-11BPC SSAI3-02-14BPC SSAI3-02-15BPC SSAI3-02-19BPC SSAI3-02-25BPC SSAI3-02-5BPC_FD SSAI3-03-11BPC SSAI3-03-14BPC SSAI3-02-5BPC SSAI3-02-8BPC SSAI3-03-5BPC** SSAI3-03-8BPC SSAI3-04-5BPC SSAI3-04-8BPC	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 280-6223-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6223-1	SSAJ3-02-16BPC	Dimethylphthalate	43U ug/Kg	A	bl
280-6223-1	SSAJ3-02-8BPC**	Dimethylphthalate	25U ug/Kg	A	bl
280-6223-1	SSAI3-04-14BPC_FD	Dimethylphthalate	29U ug/Kg	A	bl
280-6223-1	SSAI3-04-23BPC	Dimethylphthalate	30U ug/Kg	A	bl
280-6223-1	SSAI3-02-25BPC	Dimethylphthalate	34U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047B2a
SDG #: 280-6223-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 1
Reviewer: JG
2nd Reviewer: [illegible]

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: 8/07 - 09/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	≤2 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/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 = 5.6 D_2 = 11.12 D_3 = 24.21
XVII.	Field blanks	ND	* EB = 7 ~~FB = FB-040720010_R2b (from 280-22162)~~

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	SSAJ3-02-12BPC	S	11	SSAI3-04-14BPC	D, S	21	SSAI3-02-5BPC_FD	D, S	31	SSAI3-02-5BPC_FDMSD	S
2	SSAJ3-02-15BPC		12	SSAI3-04-14BPC_FD	D	22	SSAI3-03-11BPC		32	SSAI3-03-8BPCMS	
3	SSAJ3-02-16BPC		13	SSAI3-04-15BPC		23	SSAI3-03-14BPC		33	SSAI3-03-8BPCMSD	
4	SSAJ3-02-19BPC**		14	SSAI3-04-23BPC		24	SSAI3-02-5BPC	D,	34	MB 280-26583/1-A	
5	SSAJ3-02-8BPC **	D1	15	SSAI3-04-25BPC		25	SSAI3-02-8BPC		35	MB 280-26585/1-A	
6	SSAJ3-02-8BPC_FD	D,	16	SSAI3-02-11BPC		26	SSAI3-03-5BPC**		36	MB 280-26580/1-A	
7	EB-08072010	W	17	SSAI3-02-14BPC		27	SSAI3-03-8BPC		37		
8	SSAI3-03-23BPC	S	18	SSAI3-02-15BPC		28	SSAI3-04-5BPC		38		
9	SSAI3-03-25BPC		19	SSAI3-02-19BPC		29	SSAI3-04-8BPC		39		
10	SSAI3-04-11BPC		20	SSAI3-02-25BPC		30	SSAI3-02-5BPC_FDMS		40		

LDC #: 24047 B2a

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. 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 FINDINGS CHECKLIST

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 #: 24047 B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

Blank extraction date: 8/12/10 **Blank analysis date:** 8/21/10
Conc. units: ug/kg Associated Samples: 1-6 8-21

Compound	Blank ID	Sample Identification								
5X	MB 280-26583/1-A	3	5	12	14	20				
176.5 CC	35.3	43/U	25/U	29/U	30/U	34/U				

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC#: 24047B2a

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)
	5	6				
Dimethylphthalate	25	340U		315	≤340	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	11	12				
Dimethylphthalate	340U	29		311	≤340	

V:\FIELD DUPLICATES\24047B2a.wpd

LDC #: 47047B2

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	7/21/2010	1,4-Dioxane (IS1)	0.5607	0.5607	0.5706	0.5707	4.1	4.13
	MSS K		Naphthalene (IS2)	1.0611	1.0611	1.0093	1.0093	5.7	5.70
			Dimethylphthalate (IS3)	1.2729	1.2729	1.2330	1.2330	4.5	4.54
			Hexachlorobenzene (IS4)	0.2418	0.2418	0.2300	0.2300	3.8	3.81
			Chrysene (IS5)	1.1089	1.1089	1.0581	1.0581	6.7	6.75
			Benzo(a)pyrene (IS6)	1.1425	1.1425	1.0793	1.0794	8.5	8.53

Conc IS/Cpd	Area cpd	Area IS
40/50	112429	160417
40/50	817090	616036
40/50	570548	358588
40/50	161541	534527
40/50	784054	565669
40/50	774079	542046

Conc	1,4-Dioxane	Naphthalene	Dimethyl phtha	Hexachloro	Chrysene	Benzo(a)py
4.00	0.6209	1.0632	1.2104		1.1443	0.8934
10.00	0.5673	1.0390	1.2650	0.2339	1.1045	0.9948
20.00	0.5842	1.0490	1.2667	0.2330	1.1007	1.0754
50.00	**0.5607**	**1.0611**	**1.2729**	**0.2418**	**1.1089**	**1.1425**
80.00	0.5523	1.0236	1.3129	0.2310	1.0810	1.1683
120.00	0.5455	0.9799	1.2048	0.2266	0.9887	1.1297
160.00	0.5731	0.9540	1.1924	0.2305	0.9795	1.1318
200.00	0.5612	0.9045	1.1391	0.2131	0.9573	1.0989
X =	0.5707	1.0093	1.2330	0.2300	1.0581	1.0794
S =	0.0236	0.0575	0.0559	0.0088	0.0714	0.0920

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

LDC # 24047 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
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	K5786	08/21/10	1,4-Dioxane	(IS1)	0.5706	0.5426	0.5426	4.9	4.9
			Naphthalene	(IS2)	1.0093	1.1242	1.1242	11.4	11.4
			Dimethylphthalate	(IS3)	1.2330	1.3364	1.3364	8.4	8.4
			Hexachlorobenzene	(IS4)	0.2300	0.2605	0.2605	13.3	13.3
			Chrysene	(IS5)	1.0581	1.0796	1.0796	2.0	2.0
			Benzo(a)pyrene	(IS6)	1.0793	1.2130	1.2130	12.4	12.4
2	K5828	08/23/10	1,4-Dioxane	(IS1)	0.5706	0.5422	0.5422	5.0	5.0
			Naphthalene	(IS2)	1.0093	1.1210	1.1210	11.1	11.1
			Dimethylphthalate	(IS3)	1.2330	1.3646	1.3646	10.7	10.7
			Hexachlorobenzene	(IS4)	0.2300	0.2640	0.2640	14.8	14.8
			Chrysene	(IS5)	1.0581	1.0684	1.0684	1.0	1.0
			Benzo(a)pyrene	(IS6)	1.0793	1.2357	1.2357	14.5	14.5

			CCV1		CCV2	
Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	202999	187054	206796	190700
Naphthalene	(IS2)	40/80	1573122	699655	1621366	723208
Dimethylphthalate	(IS3)	40/80	1094543	409517	1141305	418177
Hexachlorobenzene	(IS4)	40/80	349167	670085	372526	705597
Chrysene	(IS5)	40/80	1632481	756042	1824855	854050
Benzo(a)pyrene	(IS6)	40/80	1580828	651624	1845845	746891

LDC #: 24047 B29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	77.7	78	78	0
2-Fluorobiphenyl	↓	78.3	78	78	
Terphenyl-d14	↓	93.1	93	93	
Phenol-d5	150	122.8	82	82	
2-Fluorophenol	↓	119.2	79	79	
2,4,6-Tribromophenol	↓	117.8	79	79	↓
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 #: 54097 B2a
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	2810	2790	0	2270	2260	81	81	81	81	0	0
Pentachlorophenol											
Pyrene	2810	2790		2360	2350	84	84	84	84	0	0

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 #: 24047 B2m

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

Reviewer: DV
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-

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	2600	NA	2260	NA	87	87				
Pentachlorophenol										
Pyrene	2600		2290		88	88				

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 #: 29047 B2A

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. ~~A~~ 26, CC:

Conc. = $\frac{(10337)(40)(1\ ml)(1000)(\ )}{(424906)(1.233)(30.1\ g)(0.931)(\ )}$

= 28.16

≈ 28 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 10 through August 11, 2010
LDC Report Date:	October 15, 2010
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 2B & 4
Laboratory:	TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6345-1

Sample Identification

SSAJ3-07-SW-E-1BPC**
SSAJ3-05-SW-E-1BPC
SSAJ3-02-SW-E-1BPC
SSAI3-04-SW-E-1BPC
SSAI3-03-SW-E-1BPC
SSAI3-02-SW-E-1BPC_FD
SSAI3-02-SW-E-1BPC
RSAJ03-0BPC
SSAI3-02-SW-W-1BPC
SSAI3-03-SW-W-1BPC
SSAI3-04-SW-W-1BPC
SSAJ3-02-SW-W-1BPC
SSAJ3-05-SW-W-1BPC
SSAJ3-07-SW-W-1BPC**
SSAJ3-07-SW-W-1BPC_FD
SSAQ3-03-0BPC
SB01-24BPC
SB02-24BPC
SB01-24BPC_FD
SSAJ3-02-SW-W-1BPCMS
SSAJ3-02-SW-W-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 21 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.

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	Surrogate	%R (Limits)	Compound	Flag	A or P
SB01-24BPC_FD	Nitrobenzene-d5 2-Fluorobiphenyl	42 (50-120) 49 (50-120)	Hexachlorobenzene	J- (all detects) UJ (all non-detects)	P

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
SSAI3-04-SW-E-1BPC SSAI3-02-SW-W-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 280-6345-1	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 SSAI3-02-SW-E-1BPC and SSAI3-02-SW-E-1BPC_FD, samples SSAJ3-07-SW-W-1BPC** and SSAJ3-07-SW-W-1BPC_FD, and samples SB01-24BPC and SB01-24BPC_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
	SSAI3-02-SW-E-1BPC	SSAI3-02-SW-E-1BPC_FD				
Octachlorostyrene	3300	3400	3 (≤50)	-	-	-
Pyrene	12	12	-	0 (≤330)	-	-
Hexachlorobenzene	24000	25000	4 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-07-SW-W-1BPC**	SSAJ3-07-SW-W-1BPC_FD				
Hexachlorobenzene	170	160	-	10 (≤340)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SB01-24BPC	SB01-24BPC_FD				
Hexachlorobenzene	1700	800	-	900 (≤340)	J (all detects)	A

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6345-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6345-1	SB01-24BPC_FD	Hexachlorobenzene	J- (all detects) UJ (all non-detects)	P	Surrogate spikes (%R) (s)
280-6345-1	SSAI3-04-SW-E-1BPC SSAI3-02-SW-W-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)
280-6345-1	SSAJ3-07-SW-E-1BPC** SSAJ3-05-SW-E-1BPC SSAJ3-02-SW-E-1BPC SSAI3-04-SW-E-1BPC SSAI3-03-SW-E-1BPC SSAI3-02-SW-E-1BPC_FD SSAI3-02-SW-E-1BPC RSAJ03-0BPC SSAI3-02-SW-W-1BPC SSAI3-03-SW-W-1BPC SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD SSAQ3-03-0BPC SB01-24BPC SB02-24BPC SB01-24BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6345-1	SB01-24BPC SB01-24BPC_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 280-6345-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6345-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047E2a
SDG #: 280-6345-1
Laboratory: Test America

Date: 10/12/10
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: 8/10 - 11/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
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_1 = 7, 6 D_2 = 14, 15 D_3 = 17, 19
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	SSAJ3-07-SW-E-1BPC**	11	SSAI3-04-SW-W-1BPC	21	SSAJ3-02-SW-W-1BPCMSD	31	MB 280-27168/1-A
2	SSAJ3-05-SW-E-1BPC	12	SSAJ3-02-SW-W-1BPC	22		32	
3	SSAJ3-02-SW-E-1BPC	13	SSAJ3-05-SW-W-1BPC	23		33	
4	SSAI3-04-SW-E-1BPC	14	SSAJ3-07-SW-W-1BPC** D_2	24		34	
5	SSAI3-03-SW-E-1BPC	15	SSAJ3-07-SW-W-1BPC_FD D_2	25		35	
6	SSAI3-02-SW-E-1BPC_FD D_1	16	SSAQ3-03-0BPC	26		36	
7	SSAI3-02-SW-E-1BPC D_1	17	SB01-24BPC D_3	27		37	
8	RSAJ03-0BPC	18	SB02-24BPC	28		38	
9	SSAI3-02-SW-W-1BPC	19	SB01-24BPC_FD D_3	29		39	
10	SSAI3-03-SW-W-1BPC	20	SSAJ3-02-SW-W-1BPCMS	30		40	

17-19 = SS only

LDC #: 24047 E3a

VALIDATION FINDINGS CHECKLIST

Reviewer: JM
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. 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 #: 24647 E39

VALIDATION FINDINGS CHECKLIST

Reviewer: JVB
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 #: 24047 E 2a

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: JV6
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
		4	TBP	24 (51- 120)	No qual (only 1 ext)
				( )	
		5		42 ( )	
				( )	
		6 (10x)		45 ( )	
				( )	
		9 (20x)	↓	32 (↓)	↓
				( )	
		19	NBZ	42 (50- 120)	J- /UJ/P (S) (SS only)
			FBP	49 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* 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 #: 24097 E2a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: DVG
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
		4, 9	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J /UJ /P (q)

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24047E2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JM
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	6				
Octachlorostyrene	3300	3400	3			
Pyrene	12	12		0	≤330	
Hexachlorobenzene	24000	25000	4			

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	14	15				
Hexachlorobenzene	170	160		10	≤340	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	17	19				
Hexachlorobenzene	1700	800		900	≤340	Jdets/A (fd)

LDC #: 24047 E29
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
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 #: 24047 E2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

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

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

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

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

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

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

LDC # 24047E2A

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	K6093	09/02/10	1,4-Dioxane	(IS1)	0.5795	0.5989	0.5989	3.3	3.3
			Naphthalene	(IS2)	1.0015	1.0241	1.0241	2.3	2.3
			Fluorene	(IS3)	1.2421	1.2707	1.2707	2.3	2.3
			Hexachlorobenzene	(IS4)	0.2313	0.2387	0.2387	3.2	3.2
			Chrysene	(IS5)	1.0679	1.0864	1.0864	1.7	1.7
			Benzo(g,h,i)perylene	(IS6)	1.0199	1.1046	1.1046	8.3	8.3
2	K5874	08/24/10	1,4-Dioxane	(IS1)	0.5706	0.5200	0.5200	8.9	8.9
			Naphthalene	(IS2)	1.0093	1.1283	1.1283	11.8	11.8
			Fluorene	(IS3)	1.2470	1.4081	1.4081	12.9	12.9
			Hexachlorobenzene	(IS4)	0.2300	0.2632	0.2632	14.5	14.5
			Chrysene	(IS5)	1.0581	1.0891	1.0891	2.9	2.9
			Benzo(g,h,i)perylene	(IS6)	0.9570	1.0899	1.0899	13.9	13.9

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	167425	139782	195412	187881
Naphthalene	(IS2)	40/80	1107956	540952	1580575	700454
Fluorene	(IS3)	40/80	806913	317514	1158634	411418
Hexachlorobenzene	(IS4)	40/80	251814	527560	353417	671295
Chrysene	(IS5)	40/80	1303161	599747	1707482	783883
Benzo(g,h,i)perylene	(IS6)	40/80	1411930	639110	1480022	678968

LDC #: 24047 E2A

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	55.2	55	55	0
2-Fluorobiphenyl		57.0	57	57	
Terphenyl-d14		80.5	81	81	
Phenol-d5	150	87.9	59	59	
2-Fluorophenol		83.7	56	56	
2,4,6-Tribromophenol		90.8	61	61	
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 #: 34047 E2c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: 20/21

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	2580	2590	0	1860	1890	72	72	73	73	2	2
Pentachlorophenol			↓								
Pyrene	2580	2590	↓	2120	2160	82	82	83	83	2	2

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 #: 29047E2C

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

LCS/LCSD samples: LCS 280-27168/2-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	1940	NA	74	74				
Pentachlorophenol		↓		↓						
Pyrene	2610	↓	2180	↓	84	84				

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 #: 24047 Eng

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. 14 , SS :

Conc. = $\frac{(20746)(40)(1\,ml)(\quad)(\quad)(\quad)}{(42573)(0.2313)(30.4g)(0.962)(\quad)}$

= 165. ✓

≈ 170 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 13, 2010

LDC Report Date: October 8, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6535-1

Sample Identification

SSAL3-07-0BPC	SSAK8-07-0BPCMS
SSAK8-10-0BPC	SSAK8-07-0BPCMSD
SSAK8-09-0BPC	
SSAK8-07-0BPC**	
SSAN6-03-0BPC	
SSAO7-03-0BPC	
SA44-0BPC	
SSAP3-01-0BPC**	
SSAO4-01-0BPC	
SSAK3-05-0BPC	
SSAK3-07-0BPC	
SSAK3-08-0BPC	
SSAL4-04-0BPC	
SSAL4-05-0BPC	
SSAN6-09-0BPC	
SSAN6-08-0BPC	
SSAN5-04-0BPC	
SSAO3-05-0BPC	
SSAO3-04-0BPC	
SSAO4-06-0BPC	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 22 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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
9/4/10	Bis(2-ethylhexyl)phthalate	31.3	All samples in SDG 280-6535-1	J+ (all detects)	A

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 280-28701/1-A	8/26/10	Bis(2-ethylhexyl)phthalate Dimethylphthalate	89.5 ug/Kg 39.8 ug/Kg	All samples in SDG 280-6535-1

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
SSAL3-07-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	160 ug/Kg 22 ug/Kg	160U ug/Kg 22U ug/Kg
SSAK8-10-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92 ug/Kg 25 ug/Kg	92U ug/Kg 25U ug/Kg
SSAK8-09-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	100 ug/Kg 130 ug/Kg	100U ug/Kg 130U ug/Kg
SSAK8-07-0BPC**	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92 ug/Kg 32 ug/Kg	92U ug/Kg 32U ug/Kg
SSAN6-03-0BPC	Bis(2-ethylhexyl)phthalate	390 ug/Kg	390U ug/Kg
SSAO7-03-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	95 ug/Kg 22 ug/Kg	95U ug/Kg 22U ug/Kg
SSAP3-01-0BPC**	Bis(2-ethylhexyl)phthalate	370 ug/Kg	370U ug/Kg
SSAO4-01-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	100 ug/Kg 29 ug/Kg	100U ug/Kg 29U ug/Kg
SSAK3-05-0BPC	Dimethylphthalate	150 ug/Kg	150U ug/Kg
SSAK3-07-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	97 ug/Kg 32 ug/Kg	97U ug/Kg 32U ug/Kg
SSAK3-08-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	96 ug/Kg 30 ug/Kg	96U ug/Kg 30U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAL4-04-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	95 ug/Kg 52 ug/Kg	95U ug/Kg 52U ug/Kg
SSAL4-05-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	98 ug/Kg 45 ug/Kg	98U ug/Kg 45U ug/Kg
SSAN6-09-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	96 ug/Kg 27 ug/Kg	96U ug/Kg 27U ug/Kg
SSAN6-08-0BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
SSAN5-04-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	99 ug/Kg 33 ug/Kg	99U ug/Kg 33U ug/Kg
SSAO3-05-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	150 ug/Kg 120 ug/Kg	150U ug/Kg 120U ug/Kg
SSAO3-04-0BPC	Bis(2-ethylhexyl)phthalate	94 ug/Kg	94U ug/Kg
SSAO4-06-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	170 ug/Kg 140 ug/Kg	170U ug/Kg 140U 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) 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
SSAK8-07-0BPC** SSAO7-03-0BPC SSAO4-01-0BPC SSAO3-04-0BPC SSAO4-06-0BPC	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 280-6535-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6535-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6535-1	SSAL3-07-0BPC SSAK8-10-0BPC SSAK8-09-0BPC SSAK8-07-0BPC** SSAN6-03-0BPC SSAO7-03-0BPC SA44-0BPC SSAP3-01-0BPC** SSAO4-01-0BPC SSAK3-05-0BPC SSAK3-07-0BPC SSAK3-08-0BPC SSAL4-04-0BPC SSAL4-05-0BPC SSAN6-09-0BPC SSAN6-08-0BPC SSAN5-04-0BPC SSAO3-05-0BPC SSAO3-04-0BPC SSAO4-06-0BPC	Bis(2-ethylhexyl)phthalate	J+ (all detects)	A	Continuing calibration (%D) (c)
280-6535-1	SSAK8-07-0BPC** SSAO7-03-0BPC SSAO4-01-0BPC SSAO3-04-0BPC SSAO4-06-0BPC	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)
280-6535-1	SSAL3-07-0BPC SSAK8-10-0BPC SSAK8-09-0BPC SSAK8-07-0BPC** SSAN6-03-0BPC SSAO7-03-0BPC SA44-0BPC SSAP3-01-0BPC** SSAO4-01-0BPC SSAK3-05-0BPC SSAK3-07-0BPC SSAK3-08-0BPC SSAL4-04-0BPC SSAL4-05-0BPC SSAN6-09-0BPC SSAN6-08-0BPC SSAN5-04-0BPC SSAO3-05-0BPC SSAO3-04-0BPC SSAO4-06-0BPC	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 280-6535-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6535-1	SSAL3-07-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	160U ug/Kg 22U ug/Kg	A	bl
280-6535-1	SSAK8-10-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92U ug/Kg 25U ug/Kg	A	bl
280-6535-1	SSAK8-09-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	100U ug/Kg 130U ug/Kg	A	bl
280-6535-1	SSAK8-07-0BPC**	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92U ug/Kg 32U ug/Kg	A	bl
280-6535-1	SSAN6-03-0BPC	Bis(2-ethylhexyl)phthalate	390U ug/Kg	A	bl
280-6535-1	SSAO7-03-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	95U ug/Kg 22U ug/Kg	A	bl
280-6535-1	SSAP3-01-0BPC**	Bis(2-ethylhexyl)phthalate	370U ug/Kg	A	bl
280-6535-1	SSAO4-01-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	100U ug/Kg 29U ug/Kg	A	bl
280-6535-1	SSAK3-05-0BPC	Dimethylphthalate	150U ug/Kg	A	bl
280-6535-1	SSAK3-07-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	97U ug/Kg 32U ug/Kg	A	bl
280-6535-1	SSAK3-08-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	96U ug/Kg 30U ug/Kg	A	bl
280-6535-1	SSAL4-04-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	95U ug/Kg 52U ug/Kg	A	bl
280-6535-1	SSAL4-05-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	98U ug/Kg 45U ug/Kg	A	bl
280-6535-1	SSAN6-09-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	96U ug/Kg 27U ug/Kg	A	bl
280-6535-1	SSAN6-08-0BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6535-1	SSAN5-04-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	99U ug/Kg 33U ug/Kg	A	bl
280-6535-1	SSAO3-05-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	150U ug/Kg 120U ug/Kg	A	bl
280-6535-1	SSAO3-04-0BPC	Bis(2-ethylhexyl)phthalate	94U ug/Kg	A	bl
280-6535-1	SSAO4-06-0BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	170U ug/Kg 140U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6535-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047F2a
SDG #: 280-6535-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 1
Reviewer: SVG
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: 8/13/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
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	N	
XVII.	Field blanks	SW	FB - *FB-04072010-R2C (from 280-2280-2) = FB-04072010-R2D (from 280-2216-2)

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 Soils

1	SSAL3-07-0BPC	11	SSAK3-07-0BPC	21	SSAK8-07-0BPCMS	31	MD 280-28701/1-A
2	SSAK8-10-0BPC	12	SSAK3-08-0BPC	22	SSAK8-07-0BPCMSD	32	
3	SSAK8-09-0BPC	13	SSAL4-04-0BPC	23		33	
4	SSAK8-07-0BPC**	14	SSAL4-05-0BPC	24		34	
5	SSAN6-03-0BPC	15	SSAN6-09-0BPC	25		35	
6	SSAO7-03-0BPC	16	SSAN6-08-0BPC	26		36	
7	SA44-0BPC	17	SSAN5-04-0BPC	27		37	
8	SSAP3-01-0BPC**	18	SSAO3-05-0BPC	28		38	
9	SSAO4-01-0BPC	19	SSAO3-04-0BPC	29		39	
10	SSAK3-05-0BPC	20	SSAO4-06-0BPC	30		40	

LDC #: 24097F29

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: ✓

Method: Semivolatiles (EPA SW 846 Method 8270C)

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

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 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. 1-Methylnaphthalene
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.

LDC #: 24067 F2a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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 continuing calibration standard analyzed at least once every 12 hours of sample analysis 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
	9/04/10	D8321 (cal)	EFE (+)	31.3		All	J+ dets /A

LDC #: 24047 F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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.

Blank extraction date: 8/26/10 **Blank analysis date:** 9/04/10
Conc. units: ug/kg Associated Samples: All

Compound	Blank ID	Sample Identification								
	MB 280-28701/1-A	1	2	3	4	5	6	8	9	
5X • 447.5 EEE	89.5	160/4	92/4	100/4	92/4	390/4	95/4	370/4	110/4	
199 CC	39.8	22/4	25/4	130/4	32/4		22/4		29/4	

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

Compound	Blank ID	Sample Identification								
	MB280-28701/1-A	10	11	12	13	14	15	16	17	18
447.5 EEE	89.5	460	97/4	96/4	95/4	98/4	96/4	100/4	99/4	150/4
199 CC	39.8	150/4	32/4	30/4	52/4	45/4	27/4		33/4	120/4

5x Phthalates
2x all others

LDC #: 34047 F2a
SDG #: Ca Cmw

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: SVG
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.

Blank extraction date: 8/26/10 **Blank analysis date:** 9/04/10
Conc. units: ug/kg Associated Samples: All

Compound	Blank ID	Sample Identification								
	MB280-28704/A	19	20							
EEE	89.5	94/U	170/U							
CCC	39.8		140/U							

4425
199

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 24047 Fr9

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

Page: 1 of ___
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
		10	TBP	29 (51-120)	No qual (only 1 out)
				( )	
		13	↓	40 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* 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 #: 24047 F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: JVB
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 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
		4, 6, 9, 19, 20	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J/UJ/p

Comments: See sample calculation verification worksheet for recalculations

LDC #: 26047 F29
SDG #: —

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	9/3/2010	1,4-Dioxane (IS1)	0.6430	0.6430	0.6429	0.6429	6.0	5.96
	MSS D		Naphthalene (IS2)	1.0799	1.0799	1.0794	1.0794	1.3	1.30
			Fluorene (IS3)	1.3494	1.3494	1.3276	1.3276	3.1	3.09
			Hexachlorobenzene (IS4)	0.2361	0.2361	0.2444	0.2444	3.9	3.87
			Chrysene (IS5)	1.0436	1.0436	1.0676	1.0676	2.4	2.39
			Benzo(g,h,i)perylene (IS6)	1.0554	1.0554	1.0292	1.0292	9.5	9.49

Conc IS/Cpd	Area cpd	Area IS
40/50	225000	279929
40/50	1473825	1091792
40/50	1168084	692526
40/50	353133	1196474
40/50	1780490	1364895
40/50	1660410	1258657

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6400	1.0847	1.2767		1.0515	0.8429
10.00	0.7256	1.0641	1.2860	0.2309	1.0670	0.9316
20.00	0.6616	1.0764	1.2870	0.2382	1.0723	1.0000
50.00	**0.6430**	**1.0799**	**1.3494**	**0.2361**	**1.0436**	**1.0554**
80.00	0.6342	1.1063	1.3874	0.2485	1.1110	1.1183
120.00	0.6253	1.0871	1.3636	0.2475	1.0913	1.0941
160.00	0.6123	1.0748	1.3487	0.2535	1.0716	1.0952
200.00	0.6009	1.0620	1.3219	0.2561	1.0325	1.0959
X =	0.6429	1.0794	1.3276	0.2444	1.0676	1.0292
S =	0.0383	0.0140	0.0410	0.0094	0.0255	0.0976

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 # 24047 F2h
SDG # See Cover

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: DVG
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	D7712	08/21/10	1,4-Dioxane (IS1)	0.643	0.646	0.646	0.6	0.6
			Naphthalene (IS2)	1.0794	1.156	1.156	7.1	7.1
			Fluorene (IS3)	1.328	1.414	1.414	6.5	6.5
			Hexachlorobenzene (IS4)	0.244	0.257	0.257	5.0	5.0
			Chrysene (IS5)	1.068	1.132	1.132	6.1	6.1
			Benzo(g,h,i)perylene (IS6)	1.029	1.162	1.162	12.9	12.9
2								

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	377899	292284		
Naphthalene (IS2)	40/80	2581143	1116216		
Fluorene (IS3)	40/80	2023429	715303		
Hexachlorobenzene (IS4)	40/80	634434	1236129		
Chrysene (IS5)	40/80	3164159	1397101		
Benzo(g,h,i)perylene (IS6)	40/80	3098416	1333412		

LDC #: 24047 F2a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	72.4	72	72	0
2-Fluorobiphenyl	↓	74.5	75	75	↓
Terphenyl-d14	↓	90.3	90	90	↓
Phenol-d5	150	114.4	76	76	↓
2-Fluorophenol	↓	114.4	76	76	↓
2,4,6-Tribromophenol	↓	123.4	82	82	↓
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 #: 24047 F2q
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: 21/27

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	2550	2550	0	1890	2110	74	74	82	82	11	11
~~Pentachlorophenol~~	↓	↓									
Pyrene	↓	↓	30	2050	2310	79	79	89	89	12	12

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 #: 25047 F2q

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

LCS/LCSD samples: LCS 280-28701/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2540	NA	1810	NA	71	71				
Pentachlorophenol		"		"						
Pyrene	2540	"	2030	"	80	80				

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 #: 24097 F2g

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer: V

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

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

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

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

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

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

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

V_i = Volume of extract injected in microliters (ul)

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

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #4 , SS:

Conc. = $\frac{(165622)(40)(1.00\ ml)(100)(\ )}{(1222077)(0.2444)(52.3g)(0.979)(\ )}$

= 701.4

≈ 700 ug/kg

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

(700)

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 16, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6583-1

Sample Identification

SA172-0BPC**
SA172-0BPC_FD
SA172-0BPCMS
SA172-0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 4 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, (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.

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 280-6583-1	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 SA172-0BPC** and SA172-0BPC_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
	SA172-0BPC**	SA172-0BPC_FD				
Pyrene	14	17	-	3 (≤330)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6583-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6583-1	SA172-0BPC** SA172-0BPC_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 280-6583-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6583-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047G2a
SDG #: 280-6583-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: JVC
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: 8/16/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD ✓✓
IV.	Continuing calibration/ICV	A	cal/ical ≤ 25 ✓
V.	Blanks	A	
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 = 1, ✓
XVII.	Field blanks	NB	FB = FB-04072010-R2C (from 280-22804-2)

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: Soil ** Indicates sample underwent Stage 4 validation

1	SA172-0BPC** D	11		21		31	
2	SA172-0BPC_FD D	12		22		32	
3	SA172-0BPCMS	13		23		33	
4	SA172-0BPCMSD	14		24		34	
5	MB 280-29198/1-A	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 24047 G2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
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. 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 #: 24047 E2 29

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.	✓			
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#: 24047G2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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				
Pyrene	14	17		3	≤330	

V:\FIELD DUPLICATES\24047G2a.wpd

LDC #: 24047 G29
SDG #: Enclosure

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: SB
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
			Pyrene	(IS5)	1.1671	1.1671	1.1364	1.1364	8.0	7.99
			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	1108295	759660
40/50	1096793	781265

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Pyrene	Benzo(g,h,i)per
4.00	0.5778	1.1018	1.3240		1.2338	0.9595
10.00	0.6003	1.0722	1.3327	0.2454	1.2475	1.0450
20.00	0.6103	1.0714	1.3075	0.2448	1.2014	1.0900
50.00	**0.5926**	**1.0571**	**1.3180**	**0.2424**	**1.1671**	**1.1231**
80.00	0.5842	1.0008	1.2564	0.2335	1.1244	1.0769
120.00	0.5678	0.9489	1.1901	0.2252	1.0661	1.0108
160.00	0.5547	0.8964	1.1248	0.2168	1.0483	0.9476
200.00	0.5485	0.8636	1.0833	0.2109	1.0025	0.9066
X =	0.5795	1.0015	1.2421	0.2313	1.1364	1.0199
S =	0.0217	0.0893	0.0977	0.0140	0.0908	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 # 24047 G2a

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	K6093	09/02/10	1,4-Dioxane (IS1)	0.5795	0.5989	0.5989	3.3	3.3
			Naphthalene (IS2)	1.0015	1.0246	1.0246	2.3	2.3
			Fluorene (IS3)	1.2421	1.2707	1.2707	2.3	2.3
			Hexachlorobenzene (IS4)	0.2313	0.2387	0.2387	3.2	3.2
			Pyrene (IS5)	1.1364	1.1552	1.1552	1.7	1.7
			Benzo(g,h,i)perylene (IS6)	1.0199	1.1046	1.1046	8.3	8.3

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	167425	139782
Naphthalene (IS2)	40/80	1107956	540652
Fluorene (IS3)	40/80	806913	317514
Hexachlorobenzene (IS4)	40/80	251814	527560
Pyrene (IS5)	40/80	1385679	599747
Benzo(g,h,i)perylene (IS6)	40/80	1411930	639110

LDC #: 24047 G27

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: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	67.0	67	67	0
2-Fluorobiphenyl		68.9	69	69	
Terphenyl-d14		81.0	81	81	
Phenol-d5	150	110.1	73	73	
2-Fluorophenol		105.4	70	70	
2,4,6-Tribromophenol		114.8	77	77	
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 #: 24047 G29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JM
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 = | MSC - MSC | * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 3/4

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	0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2690	2700	0	1950	1990	73	73	74	74	2	2
Pentachlorophenol											
Pyrene	2690	2700	14	2300	2280	85	85	84	84	0.7	0.9

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 #: 24049G2A

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

Page: 1 of 1
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 = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280-29198/2-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	2580	NA	1870	NA	72	72				
Pentachlorophenol		↓		↓						
Pyrene	~~2580~~ 2580	↓	2090	↓	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 #: 24647G20

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. # 1, ZZ:

Conc. = $\frac{(8454)(40)(1ml)(1um)(\quad)}{(73530)(1.1364)(30.3g)(0.979)(\quad)}$

= 13.69

≈ 14 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 20, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6639-1

Sample Identification

RSAN7-OBPC

Introduction

This data review covers one soil 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.

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.

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

Sample	Compound	Finding	Flag	A or P
RSAN7-OBPC	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 280-6639-1	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 identified in this SDG.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6639-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6639-1	RSAN7-OBPC	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)
280-6639-1	RSAN7-OBPC	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 280-6639-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6639-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24047H2a
SDG #: 280-6639-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [illegible]

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: 8/20/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 15%
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	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	~~FB = FB-04072010-RZC (from 280-2280-2~~

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: Soil

1	RSAN7-OBPC	11		21		31	
2	MB 280-29198/1-A	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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 #: 24047 H7a
SDG #: Sediment

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: DVE
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 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	GGG, HHH peaks unresolved, lab used total peak area for quantitation		J/UJ/P (g)

Comments: See sample calculation verification worksheet for recalculations

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 20 through August 23, 2010

LDC Report Date: October 12, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6674-1

Sample Identification

BDT-3-N-10-10BPC	EB-08202010
BDT-3-N-10-12BPC	BDT-3-N-10-10BPCMS
BDT-3-N-10-14BPC	BDT-3-N-10-10BPCMSD
BDT-3-N-10-16BPC**	
BDT-3-N-10-18BPC	
BDT-3-N-10-2BPC	
BDT-3-N-10-4BPC	
BDT-3-N-10-4BPC_FD	
BDT-3-N-10-6BPC	
BDT-3-N-10-8BPC	
BDT-3-N-20-10BPC	
BDT-3-N-20-12BPC	
BDT-3-N-20-14BPC	
BDT-3-N-20-16BPC	
BDT-3-N-20-18BPC**	
BDT-3-N-20-2BPC	
BDT-3-N-20-4BPC	
BDT-3-N-20-6BPC	
BDT-3-N-20-8BPC	
BDT-3-N-20-8BPC_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 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 280-29437/1-A	8/31/10	Bis(2-ethylhexyl)phthalate	80.7 ug/Kg	All soil samples in SDG 280-6674-1

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
BDT-3-N-10-10BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
BDT-3-N-10-12BPC	Bis(2-ethylhexyl)phthalate	89 ug/Kg	89U ug/Kg
BDT-3-N-10-16BPC**	Bis(2-ethylhexyl)phthalate	97 ug/Kg	97U ug/Kg
BDT-3-N-10-2BPC	Bis(2-ethylhexyl)phthalate	97 ug/Kg	97U ug/Kg

Sample EB-08202010 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) 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 280-6674-1	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-3-N-10-4BPC and BDT-3-N-10-4BPC_FD and samples BDT-3-N-20-8BPC and BDT-3-N-20-8BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6674-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6674-1	BDT-3-N-10-10BPC BDT-3-N-10-12BPC BDT-3-N-10-14BPC BDT-3-N-10-16BPC** BDT-3-N-10-18BPC BDT-3-N-10-2BPC BDT-3-N-10-4BPC BDT-3-N-10-4BPC_FD BDT-3-N-10-6BPC BDT-3-N-10-8BPC BDT-3-N-20-10BPC BDT-3-N-20-12BPC BDT-3-N-20-14BPC BDT-3-N-20-16BPC BDT-3-N-20-18BPC** BDT-3-N-20-2BPC BDT-3-N-20-4BPC BDT-3-N-20-6BPC BDT-3-N-20-8BPC BDT-3-N-20-8BPC_FD EB-08202010	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 280-6674-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-6674-1	BDT-3-N-10-10BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	A	bl
280-6674-1	BDT-3-N-10-12BPC	Bis(2-ethylhexyl)phthalate	89U ug/Kg	A	bl
280-6674-1	BDT-3-N-10-16BPC**	Bis(2-ethylhexyl)phthalate	97U ug/Kg	A	bl
280-6674-1	BDT-3-N-10-2BPC	Bis(2-ethylhexyl)phthalate	97U ug/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6674-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047I2a
SDG #: 280-6674-1
Laboratory: Test America

Date: 10/26/10
Page: 1 of 1
Reviewer: JG
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: 8/20-23/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 30%
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	ND	D_1 = 7, 8 D_2 = 19, 20
XVII.	Field blanks	~~SW~~	EB = 21 ~~FB = FB-041320 10-RIG2-RZE~~ (~~from 280-2400-2~~)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil + Water

1	BDT-3-N-10-10BPC	S	11	BDT-3-N-20-10BPC	S	21	EB-08202010	W	31	MB 280-29437/1-A
2	BDT-3-N-10-12BPC		12	BDT-3-N-20-12BPC		22	BDT-3-N-10-10BPCMS	S	32	MB 280-29014/1-A
3	BDT-3-N-10-14BPC		13	BDT-3-N-20-14BPC		23	BDT-3-N-10-10BPCMSD		33	
4	BDT-3-N-10-16BPC**		14	BDT-3-N-20-16BPC		24			34	
5	BDT-3-N-10-18BPC		15	BDT-3-N-20-18BPC**		25			35	
6	BDT-3-N-10-2BPC		16	BDT-3-N-20-2BPC		26			36	
7	BDT-3-N-10-4BPC	D1	17	BDT-3-N-20-4BPC		27			37	
8	BDT-3-N-10-4BPC_FD	D1	18	BDT-3-N-20-6BPC		28			38	
9	BDT-3-N-10-6BPC		19	BDT-3-N-20-8BPC	D2	29			39	
10	BDT-3-N-10-8BPC		20	BDT-3-N-20-8BPC_FD	D2	30			40	

LDC #: 24047 I 2A

VALIDATION FINDINGS CHECKLIST

Reviewer: JV2
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 $\geq$ 0.990?	✓			
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 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. 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 #: 24047 I 2A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: V

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 #: 24047I 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.

Blank extraction date: 8/31/10 **Blank analysis date:** _____

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

Compound	Blank ID	Sample Identification								
5X	MB 280-2	9437/1-A	1	2	4	6				
403.5 FEE	80.7		100/u	89/u	97/u	97/u				

Blank extraction date: _____ **Blank analysis date:** _____

Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 24047I2a

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
		18	TPH	130 (55-120)	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 #: 24047 I 2a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVB
2nd reviewer: [illegible]

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	76.4	76	76	0
2-Fluorobiphenyl	↓	75.7	76	76	↓
Terphenyl-d14	↓	86.7	87	87	↓
Phenol-d5	150	121.9	81	81	↓
2-Fluorophenol	↓	128.0	87	87	↓
2,4,6-Tribromophenol	↓	100.4	67	67	↓
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 #: 24047 I 2G
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: 22/23

Compound	Spike Added ( )		Sample Concentration ( )	Spiked Sample Concentration ( )		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	2880	0	2280	2310	79	79	80	80	1	1
Pentachlorophenol			↓								
Pyrene	2870	2880	↓	2420	2450	84	84	85	85	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 #: 24047L29

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

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

LCS/LCSD samples: LCS 280-29437/1-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	2550	NA	2090	NA	82	82				
Pentachlorophenol										
Pyrene	2550		2170		85	85				

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 #: 29047 I2g

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	9/3/2010	1,4-Dioxane (IS1)	0.6430	0.6430	0.6429	0.6429	6.0	5.96
	MSS D		Naphthalene (IS2)	1.0799	1.0799	1.0794	1.0794	1.3	1.30
			Fluorene (IS3)	1.3494	1.3494	1.3276	1.3276	3.1	3.09
			Hexachlorobenzene (IS4)	0.2361	0.2361	0.2444	0.2444	3.9	3.87
			Chrysene (IS5)	1.0436	1.0436	1.0676	1.0676	2.4	2.39
			Benzo(g,h,i)perylene (IS6)	1.0554	1.0554	1.0292	1.0292	9.5	9.49

onc IS/Cpd	Area cpd	Area IS
40/50	225000	279929
40/50	1473825	1091792
40/50	1168084	692526
40/50	353133	1196474
40/50	1780490	1364895
40/50	1660410	1258657

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6400	1.0847	1.2767		1.0515	0.8429
10.00	0.7256	1.0641	1.2860	0.2309	1.0670	0.9316
20.00	0.6616	1.0764	1.2870	0.2382	1.0723	1.0000
50.00	**0.6430**	**1.0799**	**1.3494**	**0.2361**	**1.0436**	**1.0554**
80.00	0.6342	1.1063	1.3874	0.2485	1.1110	1.1183
120.00	0.6253	1.0871	1.3636	0.2475	1.0913	1.0941
160.00	0.6123	1.0748	1.3487	0.2535	1.0716	1.0952
200.00	0.6009	1.0620	1.3219	0.2561	1.0325	1.0959
X =	0.6429	1.0794	1.3276	0.2444	1.0676	1.0292
S =	0.0383	0.0140	0.0410	0.0094	0.0255	0.0976

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 # 24047 I2G
SDG# See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: W

METHOD: GC EPA SW 846 Method 8270C

Parameter: Bis(2-eh)phthalate

Date	Column	Compound	Y area ratio	X conc ratio	X^2	
09/03/2010	Not specified	Bis(2-eh)phthalate	0.0290	0.100		0.2898
			0.1170	0.250		0.4680
			0.2768	0.500		0.5537
			0.7980	1.250		0.6384
			1.3731	2.000		0.6865
			2.0628	3.000		0.6876
			2.7364	4.000		0.6841
			3.3703	5.000		0.6741
						0.5853

Regression Output:			Reported	
Constant		-0.04618	c =	0.061100
Std Err of Y Est		0.03031		
R Squared		0.99951	r2 =	0.997500
No. of Observations		8.00000		
Degrees of Freedom		6.00000		
X Coefficient(s)	0.691474		m =	0.680400
Std Err of Coef.	0.006254			

LDC # 24047 I 29
SDG # See Cover

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: V

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	D8366	09/07/10	1,4-Dioxane	(IS1)	0.643	0.603	0.603	6.2	6.2
			Naphthalene	(IS2)	1.079	1.123	1.123	4.0	4.0
			Fluorene	(IS3)	1.328	1.396	1.396	5.1	5.1
			Hexachlorobenzene	(IS4)	0.244	0.249	0.249	1.9	1.9
			Bis(2-ethylhexyl)phthalate	(IS5)	80.000	89.200	89.180	11.5	11.5
			Benzo(g,h,i)perylene	(IS6)	1.029	1.138	1.138	10.6	10.6

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	329362	273164		
Naphthalene	(IS2)	40/80	2368897	1055116		
Fluorene	(IS3)	40/80	1864714	667902		
Hexachlorobenzene	(IS4)	40/80	572508	1149429		
Bis(2-ethylhexyl)phthalate	(IS5)	40/80	1887838	1279562		
Benzo(g,h,i)perylene	(IS6)	40/80	2819169	1238277		

LDC #: 24047 I2q
SDG #: Surface

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
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. #4, EEE:

Conc. = $\left[\frac{(5356)(\quad)}{(1190018)(\quad)(\quad)(\quad)(\quad)} + 0.0611\right](40)$

$= \frac{}{0.6804}$

$= 2.7$

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
		final conc. = $\frac{(2.7)(1\text{ml})(1\text{ml})}{(31.0\text{ g})(0.899)}$			
			= 97.2 ug/kg		

LDC Report# 24047J2a

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 23 through August 24, 2010

LDC Report Date: October 11, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6741-1

Sample Identification

EB-08232010	BDT-3-N-5-8BPC	BDT-3-S-20-8BPC
BDT-3-N-15-2BPC	BDT-3-S-15-10BPC	BDT-3-N-15-2BPCMS
BDT-3-N-15-4BPC	BDT-3-S-15-12BPC	BDT-3-N-15-2BPCMSD
BDT-3-N-15-6BPC	BDT-3-S-15-14BPC	BDT-3-S-20-10BPCMS
BDT-3-N-15-8BPC	BDT-3-S-15-14BPC_FD	BDT-3-S-20-10BPCMSD
BDT-3-N-15-10BPC	BDT-3-S-15-16BPC	
BDT-3-N-15-12BPC	BDT-3-S-15-18BPC**	
BDT-3-N-15-14BPC	BDT-3-S-15-2BPC	
BDT-3-N-15-16BPC	BDT-3-S-15-4BPC	
BDT-3-N-15-18BPC**	BDT-3-S-15-6BPC	
BDT-3-N-15-6BPC_FD	BDT-3-S-15-8BPC	
BDT-3-N-5-10BPC	BDT-3-S-20-10BPC	
BDT-3-N-5-12BPC	BDT-3-S-20-12BPC	
BDT-3-N-5-14BPC	BDT-3-S-20-14BPC	
BDT-3-N-5-16BPC	BDT-3-S-20-16BPC	
BDT-3-N-5-18BPC**	BDT-3-S-20-18BPC**	
BDT-3-N-5-2BPC	BDT-3-S-20-2BPC	
BDT-3-N-5-4BPC	BDT-3-S-20-4BPC	
BDT-3-N-5-6BPC	BDT-3-S-20-6BPC	
BDT-3-N-5-8BPC_FD	BDT-3-S-20-6BPC_FD	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 44 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.

Sample EB-08232010 was identified as an equipment blank. No semivolatile contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6741-1	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-3-N-15-6BPC and BDT-3-N-15-6BPC_FD and samples BDT-3-N-5-8BPC and BDT-3-N-5-8BPC_FD and samples BDT-3-S-15-14BPC and BDT-3-S-15-14BPC_FD and samples BDT-3-S-20-6BPC and BDT-3-S-20-6BPC_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-3-N-15-6BPC	BDT-3-N-15-6BPC_FD				
Bis(2-ethylhexyl)phthalate	96	97	-	1 (≤360)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-3-N-5-8BPC	BDT-3-N-5-8BPC_FD				
Bis(2-ethylhexyl)phthalate	90	360U	-	270 (≤360)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6741-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6741-1	EB-08232010 BDT-3-N-15-2BPC BDT-3-N-15-4BPC BDT-3-N-15-6BPC BDT-3-N-15-8BPC BDT-3-N-15-10BPC BDT-3-N-15-12BPC BDT-3-N-15-14BPC BDT-3-N-15-16BPC BDT-3-N-15-18BPC** BDT-3-N-15-6BPC_FD BDT-3-N-5-10BPC BDT-3-N-5-12BPC BDT-3-N-5-14BPC BDT-3-N-5-16BPC BDT-3-N-5-18BPC** BDT-3-N-5-2BPC BDT-3-N-5-4BPC BDT-3-N-5-6BPC BDT-3-N-5-8BPC_FD BDT-3-N-5-8BPC BDT-3-S-15-10BPC BDT-3-S-15-12BPC BDT-3-S-15-14BPC BDT-3-S-15-14BPC_FD BDT-3-S-15-16BPC BDT-3-S-15-18BPC** BDT-3-S-15-2BPC BDT-3-S-15-4BPC BDT-3-S-15-6BPC BDT-3-S-15-8BPC BDT-3-S-20-10BPC BDT-3-S-20-12BPC BDT-3-S-20-14BPC BDT-3-S-20-16BPC BDT-3-S-20-18BPC** BDT-3-S-20-2BPC BDT-3-S-20-4BPC BDT-3-S-20-6BPC BDT-3-S-20-6BPC_FD BDT-3-S-20-8BPC	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 280-6741-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6741-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6741-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047J2a
SDG #: 280-6741-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [illegible]

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: 8/23-24/10
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	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 = 4, 11 D_2 = 21, 20 D_3 = 29, 25 D_4 = 39, 40
XVII.	Field blanks	ND	EB = 1 ~~FB = FB-04 (3/20/10-RI62-RZ6 (from 260-2460-2))~~

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil + Water

1	EB-08232010 W		11	BDT-3-N-15-6BPC_FD D_1 S		21	BDT-3-N-5-8BPC D_2 S		31	BDT-3-S-15-8BPC S	
2	BDT-3-N-15-2BPC S		12	BDT-3-N-5-10BPC		22	BDT-3-S-15-10BPC		32	BDT-3-S-20-10BPC	
3	BDT-3-N-15-4BPC		13	BDT-3-N-5-12BPC		23	BDT-3-S-15-12BPC		33	BDT-3-S-20-12BPC	
4	BDT-3-N-15-6BPC D_1		14	BDT-3-N-5-14BPC		24	BDT-3-S-15-14BPC D_3		34	BDT-3-S-20-14BPC	
5	BDT-3-N-15-8BPC		15	BDT-3-N-5-16BPC		25	BDT-3-S-15-14BPC_FD D_3		35	BDT-3-S-20-16BPC	
6	BDT-3-N-15-10BPC		16	BDT-3-N-5-18BPC**		26	BDT-3-S-15-16BPC		36	BDT-3-S-20-18BPC**	
7	BDT-3-N-15-12BPC		17	BDT-3-N-5-2BPC		27	BDT-3-S-15-18BPC**		37	BDT-3-S-20-2BPC	
8	BDT-3-N-15-14BPC		18	BDT-3-N-5-4BPC		28	BDT-3-S-15-2BPC		38	BDT-3-S-20-4BPC	
9	BDT-3-N-15-16BPC		19	BDT-3-N-5-6BPC		29	BDT-3-S-15-4BPC		39	BDT-3-S-20-6BPC D_4	
10	BDT-3-N-15-18BPC**		20	BDT-3-N-5-8BPC_FD D_2		30	BDT-3-S-15-6BPC		40	BDT-3-S-20-6BPC_FD D_4	

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047J2a
SDG #: 280-6741-1
Laboratory: Test America

Date: 10/06/10
Page: 2 of 2
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		Sampling dates:
II.	GC/MS Instrument performance check		
III.	Initial calibration		see
IV.	Continuing calibration/ICV		
V.	Blanks		please
VI.	Surrogate spikes		page 1
VII.	Matrix spike/Matrix spike duplicates		
VIII.	Laboratory control samples		
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards		
XI.	Target compound identification		Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs		Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)		Not reviewed for Stage 2B validation.
XIV.	System performance		Not reviewed for Stage 2B validation.
XV.	Overall assessment of data		
XVI.	Field duplicates		
XVII.	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

41	BDT-3-S-20-8BPC	51	MB 280-29541/1-A	61		71	
42	BDT-3-N-15-2BPCMS	52	280-29746/1-A	62		72	
43	BDT-3-N-15-2BPCMSD	53	280-29755/1-A	63		73	
44	BDT-3-S-20-10BPCMS	54	280-29014/1-A	64		74	
45	BDT-3-S-20-10BPCMSD	55		65		75	
46		56		66		76	
47		57		67		77	
48		58		68		78	
49		59		69		79	
50		60		70		80	

LDC #: 24047 J2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVL
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 #: 24097 J-9

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
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#: 24047J2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JV
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	11				
Bis(2-ethylhexyl)phthalate	96	97		1	≤360	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	21	20				
Bis(2-ethylhexyl)phthalate	90	360U		270	≤360	

LDC #: 24047 JGa

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	8/30/2010	1,4-Dioxane (IS1)	0.6494	0.6494	0.6538	0.6538	3.2	3.21
	MSS B		Naphthalene (IS2)	1.0810	1.0810	1.0482	1.0482	11.0	11.01
			Fluorene (IS3)	1.3696	1.3696	1.3037	1.3037	11.0	10.98
			Hexachlorobenzene (IS4)	0.2517	0.2517	0.2454	0.2454	3.8	3.76
			Chrysene (IS5)	1.1455	1.1455	1.0975	1.0975	8.1	8.10
			Benzo(g,h,i)perylene (IS6)	1.1162	1.1162	1.0926	1.0927	2.5	2.49

onc IS/Cpd	Area cpd	Area IS
40/50	199862	246217
40/50	1299821	961965
40/50	956646	558782
40/50	297546	945857
40/50	1516369	1059049
40/50	1447002	1037135

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6780	1.1880	1.4403	0.2501	1.1731	1.0576
10.00	0.6510	1.1590	1.4246	0.2516	1.1774	1.0704
20.00	0.6855	1.1306	1.4342	0.2514	1.1786	1.0855
50.00	**0.6494**	**1.0810**	**1.3696**	**0.2517**	**1.1455**	**1.1162**
80.00	0.6655	1.0601	1.3277	0.2522	1.1198	1.1433
120.00	0.6423	0.9839	1.2284	0.2435	1.0281	1.1029
160.00	0.6276	0.9020	1.1307	0.2339	1.0006	1.0822
200.00	0.6313	0.8811	1.0742	0.2287	0.9572	1.0831
X =	0.6538	1.0482	1.3037	0.2454	1.0975	1.0927
S =	0.0210	0.1154	0.1432	0.0092	0.0889	0.0273

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 #: 24047J2G

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	9/3/2010	1,4-Dioxane (IS1)	0.6430	0.6430	0.6429	0.6429	6.0	5.96
	MSS D		Naphthalene (IS2)	1.0799	1.0799	1.0794	1.0794	1.3	1.30
			Fluorene (IS3)	1.3494	1.3494	1.3276	1.3276	3.1	3.09
			Hexachlorobenzene (IS4)	0.2361	0.2361	0.2444	0.2444	3.9	3.87
			Chrysene (IS5)	1.0436	1.0436	1.0676	1.0676	2.4	2.39
			Benzo(g,h,i)perylene (IS6)	1.0554	1.0554	1.0292	1.0292	9.5	9.49

Conc IS/Cpd	Area cpd	Area IS
40/50	225000	279929
40/50	1473825	1091792
40/50	1168084	692526
40/50	353133	1196474
40/50	1780490	1364895
40/50	1660410	1258657

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6400	1.0847	1.2767		1.0515	0.8429
10.00	0.7256	1.0641	1.2860	0.2309	1.0670	0.9316
20.00	0.6616	1.0764	1.2870	0.2382	1.0723	1.0000
50.00	**0.6430**	**1.0799**	**1.3494**	**0.2361**	**1.0436**	**1.0554**
80.00	0.6342	1.1063	1.3874	0.2485	1.1110	1.1183
120.00	0.6253	1.0871	1.3636	0.2475	1.0913	1.0941
160.00	0.6123	1.0748	1.3487	0.2535	1.0716	1.0952
200.00	0.6009	1.0620	1.3219	0.2561	1.0325	1.0959
X =	0.6429	1.0794	1.3276	0.2444	1.0676	1.0292
S =	0.0383	0.0140	0.0410	0.0094	0.0255	0.0976

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 # 24047 J24
SDG# San Luis

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: W

METHOD: GC EPA SW 846 Method 8270C

Parameter: Bis(2-eh)phthalate

Date	Column	Compound	Y area ratio	X conc ratio	X^2	
09/03/2010	Not specified	Bis(2-eh)phthalate	0.0290	0.100		0.2898
			0.1170	0.250		0.4680
			0.2768	0.500		0.5537
			0.7980	1.250		0.6384
			1.3731	2.000		0.6865
			2.0628	3.000		0.6876
			2.7364	4.000		0.6841
			3.3703	5.000		0.6741
						0.5853

Regression Output:		Reported	
Constant	-0.04618	c =	0.061100
Std Err of Y Est	0.03031		
R Squared	0.99951	r2 =	0.997500
No. of Observations	8.00000		
Degrees of Freedom	6.00000		
X Coefficient(s) 0.691474		m =	0.680400
Std Err of Coef. 0.006254			

LDC #24047 J2a
SDG # See Cover

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: DVG
2nd Reviewer: W

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	D8366	09/07/10	1,4-Dioxane	(IS1)	0.643	0.603	0.603	6.2	6.2
			Naphthalene	(IS2)	1.079	1.123	1.123	4.0	4.0
			Fluorene	(IS3)	1.328	1.396	1.396	5.1	5.1
			Hexachlorobenzene	(IS4)	0.244	0.249	0.249	1.9	1.9
			Bis(2-ethylhexyl)phthalate	(IS5)	80.000	89.200	89.180	11.5	11.5
			Benzo(g,h,i)perylene	(IS6)	1.029	1.138	1.138	10.6	10.6
2	D8411	09/08/10	1,4-Dioxane	(IS1)	0.643	0.638	0.638	0.7	0.7
			Naphthalene	(IS2)	1.079	1.116	1.116	3.4	3.4
			Fluorene	(IS3)	1.328	1.371	1.371	3.3	3.3
			Hexachlorobenzene	(IS4)	0.244	0.250	0.250	2.4	2.4
			Bis(2-ethylhexyl)phthalate	(IS5)	80.000	84.500	84.480	5.6	5.6
			Benzo(g,h,i)perylene	(IS6)	1.029	1.164	1.164	13.1	13.1

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	329362	273164	331786	259818
Naphthalene	(IS2)	40/80	2368897	1055116	2226266	997033
Fluorene	(IS3)	40/80	1864714	667902	1761648	642587
Hexachlorobenzene	(IS4)	40/80	572508	1149429	547910	1094403
Bis(2-ethylhexyl)phthalate	(IS5)	40/80	1887838	1279562	1774419	1271596
Benzo(g,h,i)perylene	(IS6)	40/80	2819169	1238277	2855048	1226593

LDC # 24047Jra
SDG # See Cover

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: LA

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	B0064	09/04/10	1,4-Dioxane (IS1)	0.654	0.652	0.652	0.3	0.3
			Naphthalene (IS2)	1.048	1.064	1.064	1.5	1.5
			Fluorene (IS3)	1.304	1.341	1.341	2.9	2.9
			Hexachlorobenzene (IS4)	0.245	0.242	0.242	1.5	1.5
			Chrysene (IS5)	1.098	1.095	1.095	0.2	0.2
			Benzo(g,h,i)perylene (IS6)	1.093	1.135	1.135	3.9	3.9
2	B0151	09/08/10	1,4-Dioxane (IS1)	0.654	0.626	0.626	4.2	4.2
			Naphthalene (IS2)	1.029	1.056	1.056	2.6	2.6
			Fluorene (IS3)	1.286	1.305	1.305	1.5	1.5
			Hexachlorobenzene (IS4)	0.245	0.233	0.233	4.8	4.8
			Chrysene (IS5)	1.078	1.085	1.085	0.7	0.7
			Benzo(g,h,i)perylene (IS6)	1.035	1.131	1.131	9.3	9.3

Compound	Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	40/80	307634	236058	298831	238575	298831	238575
Naphthalene	40/80	1961036	921628	1961939	929068	1961939	929068
Fluorene	40/80	1415785	527712	1398808	535829	1398808	535829
Hexachlorobenzer	40/80	435990	902311	428209	916980	428209	916980
Chrysene	40/80	2155462	983874	2106014	970074	2106014	970074
Benzo(g,h,i)peryle	40/80	2233492	983827	2199377	972419	2199377	972419

LDC #: 24047 J29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: DVC
2nd reviewer: [illegible]

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: #10

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	67.7	68	68	0
2-Fluorobiphenyl	↓	73.1	73	73	↓
Terphenyl-d14	↓	97.4	97	97	↓
Phenol-d5	150	106.5	71	71	↓
2-Fluorophenol	↓	105.9	71	71	↓
2,4,6-Tribromophenol	↓	112.3	75	75	✓
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 #: 24047J29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVC
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: 42/43

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	2800	2720	0	2190	2230	78	78	82	82	2	2
Pentachlorophenol											
Pyrene	2800	2720	0	2410	2350	86	86	84	84	2	2

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 #: 24047 J2a

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

Reviewer: JM
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 = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280 – 29541/2-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	2670	NA	2120	NA	80	80				
Pentachlorophenol		↓		↓						
Pyrene	2670	↓	2320	↓	87	87				

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 #: 24047 Jrq

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. # 16 , EEE :

Conc = [(5607)(40) / (1281275)(0.6804) + 0.0611](40)

= 2.70

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
		final conc. = 2.70		(1 ml)(1000) / (30.0 g)(0.916)	
			= 98.25		
			≈ 98 ug/kg		

RECALC.2S

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 24, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6783-1

Sample Identification

BDT-3-S-5-10BPC
BDT-3-S-5-12BPC
BDT-3-S-5-14BPC
BDT-3-S-5-16BPC
BDT-3-S-5-18BPC**
BDT-3-S-5-2BPC
BDT-3-S-5-4BPC
BDT-3-S-5-6BPC
BDT-3-S-5-8BPC
BDT-3-S-10-10BPC
BDT-3-S-10-12BPC
BDT-3-S-10-14BPC
BDT-3-S-10-16BPC
BDT-3-S-10-18BPC**
BDT-3-S-10-2BPC
BDT-3-S-10-4BPC
BDT-3-S-10-4BPC_FD
BDT-3-S-10-6BPC
BDT-3-S-10-8BPC
BDT-3-S-5-2BPCMS
BDT-3-S-5-2BPCMSD
BDT-3-S-5-4BPCMS
BDT-3-S-5-4BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 23 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, (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.

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 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 280-6783-1	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-3-S-10-4BPC and BDT-3-S-10-4BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6783-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6783-1	BDT-3-S-5-10BPC BDT-3-S-5-12BPC BDT-3-S-5-14BPC BDT-3-S-5-16BPC BDT-3-S-5-18BPC** BDT-3-S-5-2BPC BDT-3-S-5-4BPC BDT-3-S-5-6BPC BDT-3-S-5-8BPC BDT-3-S-10-10BPC BDT-3-S-10-12BPC BDT-3-S-10-14BPC BDT-3-S-10-16BPC BDT-3-S-10-18BPC** BDT-3-S-10-2BPC BDT-3-S-10-4BPC BDT-3-S-10-4BPC_FD BDT-3-S-10-6BPC BDT-3-S-10-8BPC	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 280-6783-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6783-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047K2a
SDG #: 280-6783-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: NG
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: 8/24/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r ✓
IV.	Continuing calibration/ICV	A	CW/ICW ≤ 25%
V.	Blanks	A	
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	ND	D = 16, 17
XVII.	Field blanks	SW/E	~~FB = FB-0413-2010, RI62-R2E (from 280-2400-2~~

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 Soils

1	BDT-3-S-5-10BPC	11	BDT-3-S-10-12 BPC		21	BDT-3-S-5-2~~MSD~~ BPC MSD		31	MB 280-29755/1-A
2	BDT-3-S-5-12BPC	12	BDT-3-S-10-14		22	BDT-3-S-5-4~~MS~~ MS		32	MB 280-29889/1-A
3	BDT-3-S-5-14BPC	13	BDT-3-S-10-16		23	BDT-3-S-5-4~~MSD~~ MSD		33	
4	BDT-3-S-5-16BPC	14	BDT-3-S-10-18**		24			34	
5	BDT-3-S-5-18BPC**	15	BDT-3-S-10-2		25			35	
6	BDT-3-S-5-2 BPC	16	BDT-3-S-10-4	D	26			36	
7	BDT-3-S-5-4	17	BDT-3-S-10-4~~EB~~ FD	D	27			37	
8	BDT-3-S-5-6	18	BDT-3-S-10-6		28			38	
9	BDT-3-S-5-8	19	BDT-3-S-10-8		29			39	
10	BDT-3-S-10-10	20	BDT-3-S-5-2~~MS~~ MS		30			40	

LDC #: 24047 F2a

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?	✓			
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 #: 24047 K29

VALIDATION FINDINGS CHECKLIST

Reviewer: JV
2nd Reviewer: N

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 #: 24047 k2a

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	9/7/2010	1,4-Dioxane	(IS1)	0.6211	0.6211	0.6078	0.6078	4.6	4.60
	MSS Y		Naphthalene	(IS2)	1.0905	1.0905	1.1045	1.1045	2.1	2.14
			Fluorene	(IS3)	1.2364	1.2364	1.2854	1.2854	5.5	5.51
			Hexachlorobenzene	(IS4)	0.2096	0.2096	0.2150	0.2150	6.4	6.44
			Chrysene	(IS5)	1.1090	1.1090	1.1025	1.1025	2.7	2.65
			Benzo(g,h,i)perylene	(IS6)	0.9979	0.9979	1.0022	1.0022	9.8	9.82

Conc IS/Cpd	Area cpd	Area IS
40/50	211270	272113
40/50	1452752	1065726
40/50	1038301	671801
40/50	275363	1051118
40/50	1443358	1041159
40/50	1067705	855935

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00		1.0765	1.2003		1.0903	0.8090
10.00	0.6455	1.0884	1.2284	0.1920	1.0698	0.9296
20.00	0.5733	1.0785	1.2225	0.2033	1.0870	0.9649
50.00	**0.6211**	**1.0905**	**1.2364**	**0.2096**	**1.1090**	**0.9979**
80.00	0.6367	1.1224	1.3100	0.2235	1.1499	1.0699
120.00	0.5993	1.1231	1.3577	0.2215	1.0926	1.0746
160.00	0.6021	1.1381	1.3567	0.2235	1.1424	1.0836
200.00	0.5769	1.1181	1.3713	0.2314	1.0792	1.0883
X =	0.6078	1.1045	1.2854	0.2150	1.1025	1.0022
S =	0.0279	0.0236	0.0709	0.0138	0.0292	0.0985

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 #: 24047 K2a

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	8/30/2010	1,4-Dioxane (IS1)	0.6494	0.6494	0.6538	0.6538	3.2	3.21
	MSS B		Naphthalene (IS2)	1.0810	1.0810	1.0482	1.0482	11.0	11.01
			Fluorene (IS3)	1.3696	1.3696	1.3037	1.3037	11.0	10.98
			Hexachlorobenzene (IS4)	0.2517	0.2517	0.2454	0.2454	3.8	3.76
			Chrysene (IS5)	1.1455	1.1455	1.0975	1.0975	8.1	8.10
			Benzo(g,h,i)perylene (IS6)	1.1162	1.1162	1.0926	1.0927	2.5	2.49

Conc IS/Cpd	Area cpd	Area IS
40/50	199862	246217
40/50	1299821	961965
40/50	956646	558782
40/50	297546	945857
40/50	1516369	1059049
40/50	1447002	1037135

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6780	1.1880	1.4403	0.2501	1.1731	1.0576
10.00	0.6510	1.1590	1.4246	0.2516	1.1774	1.0704
20.00	0.6855	1.1306	1.4342	0.2514	1.1786	1.0855
50.00	**0.6494**	**1.0810**	**1.3696**	**0.2517**	**1.1455**	**1.1162**
80.00	0.6655	1.0601	1.3277	0.2522	1.1198	1.1433
120.00	0.6423	0.9839	1.2284	0.2435	1.0281	1.1029
160.00	0.6276	0.9020	1.1307	0.2339	1.0006	1.0822
200.00	0.6313	0.8811	1.0742	0.2287	0.9572	1.0831
X =	0.6538	1.0482	1.3037	0.2454	1.0975	1.0927
S =	0.0210	0.1154	0.1432	0.0092	0.0889	0.0273

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 #24047k29

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	B0151	09/08/10	1,4-Dioxane	(IS1)	0.6538	0.6263	0.6263	4.2	4.2
	MSS B		Naphthalene	(IS2)	1.0482	1.0559	1.0559	0.7	0.7
			Fluorene	(IS3)	1.3037	1.3053	1.3053	0.1	0.1
			Hexachlorobenzene	(IS4)	0.2454	0.2335	0.2335	4.9	4.9
			Chrysene	(IS5)	1.0975	1.0855	1.0855	1.1	1.1
			Benzo(g,h,i)perylene	(IS6)	1.0926	1.1309	1.1309	3.5	3.5
2	Y4788	09/09/10	1,4-Dioxane	(IS1)	0.6078	0.6320	0.6320	4.0	4.0
	MSS Y		Naphthalene	(IS2)	1.1045	1.1416	1.1416	3.4	3.4
			Fluorene	(IS3)	1.2854	1.3272	1.3272	3.3	3.3
			Hexachlorobenzene	(IS4)	0.2150	0.2221	0.2221	3.3	3.3
			Chrysene	(IS5)	1.1025	1.1718	1.1718	6.3	6.3
			Benzo(g,h,i)perylene	(IS6)	1.0022	1.0318	1.0318	2.9	2.9

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	298831	238575	297038	234991
Naphthalene	(IS2)	40/80	1961939	929068	2066321	904989
Fluorene	(IS3)	40/80	1398808	535829	1486157	559884
Hexachlorobenzene	(IS4)	40/80	428209	916980	398387	896746
Chrysene	(IS5)	40/80	2106014	970074	1953523	833558
Benzo(g,h,i)perylene	(IS6)	40/80	2199377	972419	1333281	646123

LDC #: 24047 K29

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	72.5	72	72	0
2-Fluorobiphenyl	↓	74.9	75	75	
Terphenyl-d14	↓	78.3	78	78	
Phenol-d5	150	113.8	76	76	
2-Fluorophenol	↓	111.2	74	74	
2,4,6-Tribromophenol	↓	98.9	66	66	
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 #: 29047 K2q
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 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: 20/21

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	2900	2890	0	2310	2120	80	80	73	73	9	9
Pentachlorophenol											
Pyrene	2900	2890	"	2490	2340	86	86	78	78	10	10

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

LDC #: 24047 1529

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

Reviewer: JM
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: LCS 280-29755/2-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	2600	NA	1930	NA	74	74				
Pentachlorophenol		↓		↓						
Pyrene	2600	↓	2030	↓	78	78				

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

LDC #: 47047 K29

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. _____, MB:

Conc. = ( )( )( )( )( )
( )( )( )( )( )

=

#	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 25, 2010

LDC Report Date: October 11, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6818-1

Sample Identification

BDT-2-N-20-10.0BPC
BDT-2-N-20-12.0BPC
BDT-2-N-20-14.0BPC
BDT-2-N-20-2.0BPC
BDT-2-N-20-4.0BPC
BDT-2-N-20-6.0BPC
BDT-2-N-20-8.0BPC
BDT-2-N-20-12.0BPC_FD
BDT-2-N-15-1.0BPC
BDT-2-N-15-12.0BPC
BDT-2-N-15-14.0BPC**
BDT-2-N-5-2.0BPC
BDT-2-N-15-4.0BPC
BDT-2-N-15-6.0BPC
BDT-2-N-15-8.0BPC
BDT-2-N-5-10BPC
BDT-2-N-5-12BPC
BDT-2-N-5-14BPC**
BDT-2-N-5-12BPC_FD
BDT-2-N-5-8BPC
BDT-2-N-5-2BPC
BDT-2-N-5-4BPC
BDT-2-N-5-6BPC
BDT-2-N-10-10BPC
BDT-2-N-10-12BPC
BDT-2-N-10-14BPC**
BDT-2-N-10-2BPC
BDT-2-N-10-4BPC
BDT-2-N-10-6BPC
BDT-2-N-10-8BPC
BDT-2-N-10-6BPC_FD
EB-08252010
BDT-2-N-15-6.0BPCMS
BDT-2-N-15-6.0BPCMSD
BDT-2-N-10-6BPCMS
BDT-2-N-10-6BPCMSD

**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 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, (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.

Sample EB-08252010 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) 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 280-6818-1	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-2-N-20-12.0BPC and BDT-2-N-20-12.0BPC_FD and samples BDT-2-N-5-12BPC and BDT-2-N-5-12BPC_FD and samples BDT-2-N-10-6BPC and BDT-2-N-10-6BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6818-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6818-1	BDT-2-N-20-10.0BPC BDT-2-N-20-12.0BPC BDT-2-N-20-14.0BPC BDT-2-N-20-2.0BPC BDT-2-N-20-4.0BPC BDT-2-N-20-6.0BPC BDT-2-N-20-8.0BPC BDT-2-N-20-12.0BPC_FD BDT-2-N-15-1.0BPC BDT-2-N-15-12.0BPC BDT-2-N-15-14.0BPC** BDT-2-N-5-2.0BPC BDT-2-N-15-4.0BPC BDT-2-N-15-6.0BPC BDT-2-N-15-8.0BPC BDT-2-N-5-10BPC BDT-2-N-5-12BPC BDT-2-N-5-14BPC** BDT-2-N-5-12BPC_FD BDT-2-N-5-8BPC BDT-2-N-5-2BPC BDT-2-N-5-4BPC BDT-2-N-5-6BPC BDT-2-N-10-10BPC BDT-2-N-10-12BPC BDT-2-N-10-14BPC** BDT-2-N-10-2BPC BDT-2-N-10-4BPC BDT-2-N-10-6BPC BDT-2-N-10-8BPC BDT-2-N-10-6BPC_FD EB-08252010	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 280-6818-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6818-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-6818-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047L2a
SDG #: 280-6818-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: SVG
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: 8/25/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD rr
IV.	Continuing calibration/ICV	A	cw/icv ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
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	ND	D_1 = 2, 8 D_2 = 19, 19 D_3 = 29, 31 D= 17, 19
XVII.	Field blanks	~~SWD~~	*EB = 32 ~~FB = EB-04132010-RIG2-RZE (from 280-24000-2)~~

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

soil + water

1	BDT-2-N-20-10.0BPC S	11	BDT-2-N-15-14.0BPC** S	21	BDT-2-N-5-2BPC	31	BDT-2-N-10-6BPC_FD D_3 S
2	BDT-2-N-20-12.0BPC D_1	12	BDT-2-N-5-2.0BPC	22	BDT-2-N-5-4BPC	32	EB-08252010 W
3	BDT-2-N-20-14.0BPC	13	BDT-2-N-15-4.0BPC	23	BDT-2-N-5-6BPC	33	BDT-2-N-15-6.0BPCMS S
4	BDT-2-N-20-2.0BPC	14	BDT-2-N-15-6.0BPC	24	BDT-2-N-10-10BPC	34	BDT-2-N-15-6.0BPCMSD
5	BDT-2-N-20-4.0BPC	15	BDT-2-N-15-8.0BPC	25	BDT-2-N-10-12BPC	35	BDT-2-N-10-6BPCMS
6	BDT-2-N-20-6.0BPC	16	BDT-2-N-5-10BPC	26	BDT-2-N-10-14BPC**	36	BDT-2-N-10-6BPCMSD
7	BDT-2-N-20-8.0BPC	17	BDT-2-N-5-12BPC D-1	27	BDT-2-N-10-2BPC	37	MB 280-29889/1-A
8	BDT-2-N-20-12.0BPC_FD D_1	18	BDT-2-N-5-14BPC**	28	BDT-2-N-10-4BPC	38	280-29898/1-A
9	BDT-2-N-15-1.0BPC	19	BDT-2-N-5-12BPC_FD D_2	29	BDT-2-N-10-6BPC D_3	39	280-29938/1-A
10	BDT-2-N-15-12.0BPC ~~SWD~~	20	BDT-2-N-5-8BPC	30	BDT-2-N-10-8BPC	40	280-29647/1-A

LDC #: 24097 L 29

VALIDATION FINDINGS CHECKLIST

Reviewer: JV2
2nd Reviewer: KC

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?				

LDC #: 74057 L2a

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 #: 24047L29

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
		26	TBP	48 (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 #: 24047L29
SDG #: SmCmv

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: W

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

Conc 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 # 24047 L2a

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	K6193	09/09/10	1,4-Dioxane	(IS1)	0.5795	0.5841	0.5841	0.8	0.8
			Naphthalene	(IS2)	1.0015	1.0152	1.0152	1.4	1.4
			Fluorene	(IS3)	1.2421	1.2642	1.2642	1.8	1.8
			Hexachlorobenzene	(IS4)	0.2313	0.2327	0.2327	0.6	0.6
			Chrysene	(IS5)	1.0679	1.0666	1.0666	0.1	0.1
			Benzo(g,h,i)perylene	(IS6)	1.0199	1.0547	1.0547	3.4	3.4
2	K6237	09/10/10	1,4-Dioxane	(IS1)	0.5795	0.5753	0.5753	0.7	0.7
			Naphthalene	(IS2)	1.0015	1.0208	1.0208	1.9	1.9
			Fluorene	(IS3)	1.2421	1.2704	1.2704	2.3	2.3
			Hexachlorobenzene	(IS4)	0.2313	0.2290	0.2290	1.0	1.0
			Chrysene	(IS5)	1.0679	1.1085	1.1085	3.8	3.8
			Benzo(g,h,i)perylene	(IS6)	1.0199	1.0470	1.0470	2.7	2.7

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	263848	225842	251284	218375
Naphthalene	(IS2)	40/80	1781060	877199	1721673	843308
Fluorene	(IS3)	40/80	1311374	518654	1264005	497473
Hexachlorobenzene	(IS4)	40/80	401614	863117	378514	826274
Chrysene	(IS5)	40/80	1915436	897927	1928995	870082
Benzo(g,h,i)perylene	(IS6)	40/80	1979145	938251	1826647	872308

LDC #: 24047 L2g

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: [illegible]

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: # 11

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	67.5	67	67	0
2-Fluorobiphenyl	↓	72.6	73	73	
Terphenyl-d14	↓	85.8	86	86	↓
Phenol-d5	150	106.4	71	71	
2-Fluorophenol	↓	98.6	66	66	
2,4,6-Tribromophenol	↓	95.4	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 #: 34047L29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: 33 / 34

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	2780	0	2140	2110	78	78	76	76	1	1
Pentachlorophenol											
Pyrene	2740	2780		2420	2490	88	88	90	90	3	3

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 #: 24047 L2a

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: LA

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 – 29898 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	2670	NA	2670	NA	78	78				
Pentachlorophenol		↓		↓						
Pyrene	2670	↓	2330	↓	89	87				

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 #: 24047 L2a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JW
2nd reviewer: [illegible]

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: August 26, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6851-1

Sample Identification

BDT-2-S-20-10BPC
BDT-2-S-20-12BPC
BDT-2-S-20-14BPC**
BDT-2-S-20-2BPC
BDT-2-S-20-4BPC
BDT-2-S-20-6BPC
BDT-2-S-20-6BPC_FD
BDT-2-S-20-8BPC
BDT-2-S-15-10BPC
BDT-2-S-15-12BPC
BDT-2-S-15-14BPC**
BDT-2-S-15-2BPC
BDT-2-S-15-4BPC
BDT-2-S-15-6BPC
BDT-2-S-15-8BPC
BDT-2-S-15-2BPC_FD
BDT-2-S-5-10BPC
BDT-2-S-5-12BPC
BDT-2-S-5-14BPC**
BDT-2-S-5-12BPC_FD
BDT-2-S-5-8BPC
BDT-2-S-5-2BPC
BDT-2-S-5-4BPC
BDT-2-S-5-6BPC
BDT-2-S-10-10BPC
BDT-2-S-10-12BPC
BDT-2-S-10-14BPC**
BDT-2-S-10-2BPC
BDT-2-S-10-4BPC
BDT-2-S-10-6BPC
BDT-2-S-10-8BPC
SSAJ3-02-5BPC
EB-08262010
BDT-2-S-5-10BPCMS
BDT-2-S-5-10BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 34 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.

Sample EB-08262010 was identified as an equipment blank. No semivolatile contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Flag	A or P
BDT-2-S-5-2BPC BDT-2-S-10-2BPC	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 280-6851-1	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-2-S-20-6BPC and BDT-2-S-20-6BPC_FD, samples BDT-2-S-15-2BPC and BDT-2-S-15-2BPC_FD, and samples BDT-2-S-5-12BPC and BDT-2-S-5-12BPC_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-2-S-20-6BPC	BDT-2-S-20-6BPC_FD				
Hexachlorobenzene	37	79	-	42 (≤350)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-S-15-2BPC	BDT-2-S-15-2BPC_FD				
Benzo(a)anthracene	20	340U	-	320 (≤340)	-	-
Chrysene	50	29	-	21 (≤340)	-	-
Hexachlorobenzene	950	510	-	440 (≤340)	J (all detects)	A
Octachlorostyrene	160	110	-	50 (≤340)	-	-
Pyrene	19	340U	-	321 (≤340)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-S-5-12BPC	BDT-2-S-5-12BPC_FD				
Hexachlorobenzene	170	200	-	30 (≤370)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6851-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6851-1	BDT-2-S-5-2BPC BDT-2-S-10-2BPC	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)
280-6851-1	BDT-2-S-20-10BPC BDT-2-S-20-12BPC BDT-2-S-20-14BPC** BDT-2-S-20-2BPC BDT-2-S-20-4BPC BDT-2-S-20-6BPC BDT-2-S-20-6BPC_FD BDT-2-S-20-8BPC BDT-2-S-15-10BPC BDT-2-S-15-12BPC BDT-2-S-15-14BPC** BDT-2-S-15-2BPC BDT-2-S-15-4BPC BDT-2-S-15-6BPC BDT-2-S-15-8BPC BDT-2-S-15-2BPC_FD BDT-2-S-5-10BPC BDT-2-S-5-12BPC BDT-2-S-5-14BPC** BDT-2-S-5-12BPC_FD BDT-2-S-5-8BPC BDT-2-S-5-2BPC BDT-2-S-5-4BPC BDT-2-S-5-6BPC BDT-2-S-10-10BPC BDT-2-S-10-12BPC BDT-2-S-10-14BPC** BDT-2-S-10-2BPC BDT-2-S-10-4BPC BDT-2-S-10-6BPC BDT-2-S-10-8BPC SSAJ3-02-5BPC EB-08262010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6851-1	BDT-2-S-15-2BPC BDT-2-S-15-2BPC_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 280-6851-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6851-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047M2a
SDG #: 280-6851-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 1
Reviewer: JVL
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: 8/26/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	A	CW/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
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 = 6,7 D_2 = 12,16 D_3 = 18,20
XVII.	Field blanks	ND	*EB = 33 ~~FB = FB-041220 10-RIG2-RZE~~ (from 280-2700-2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil + Water

1	BDT-2-S-20-10BPC	S	11	BDT-2-S-15-14BPC**	S	21	BDT-2-S-5-8BPC	S	31	BDT-2-S-10-8BPC	S
2	BDT-2-S-20-12BPC		12	BDT-2-S-15-2BPC	D_2	22	BDT-2-S-5-2BPC (1X/10X)		32	SSAJ3-02-5BPC	
3	BDT-2-S-20-14BPC**		13	BDT-2-S-15-4BPC		23	BDT-2-S-5-4BPC		33	EB-08262010	W
4	BDT-2-S-20-2BPC		14	BDT-2-S-15-6BPC		24	BDT-2-S-5-6BPC		34	BDT-2-S-5-10BPCMS	S
5	BDT-2-S-20-4BPC		15	BDT-2-S-15-8BPC		25	BDT-2-S-10-10BPC		35	BDT-2-S-5-10BPCMSD	
6	BDT-2-S-20-6BPC	D_1	16	BDT-2-S-15-2BPC_FD	D_2	26	BDT-2-S-10-12BPC		36	MB 280-29938/1-A	
7	BDT-2-S-20-6BPC_FD	D_1	17	BDT-2-S-5-10BPC		27	BDT-2-S-10-14BPC**		37	MB 280-29978/1-A	
8	BDT-2-S-20-8BPC		18	BDT-2-S-5-12BPC	D_3	28	BDT-2-S-10-2BPC		38	MB 280-29647/1-A	
9	BDT-2-S-15-10BPC		19	BDT-2-S-5-14BPC**		29	BDT-2-S-10-4BPC		39		
10	BDT-2-S-15-12BPC		20	BDT-2-S-5-12BPC_FD	D_3	30	BDT-2-S-10-6BPC		40		

LDC #: 24047 M29

VALIDATION FINDINGS CHECKLIST

Reviewer: JVR
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 $\geq$ 0.990?	✓			
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 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 #: 24047 M3a

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: VG
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
		20	TBP	45 (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 #: 24047 M2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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 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
		22, 28	GGG, HHH peaks unresolved		J/UJ/P (q)
			lab used total peak area		
			for quantitation		

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24047M2a

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)
	6	7				
Hexachlorobenzene	37	79		42	≤350	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	12	16				
Benzo(a)anthracene	20	340U		320	≤340	
Chrysene	50	29		21	≤340	
Hexachlorobenzene	950	510		440	≤340	Jdet/A (fd)
Octachlorostyrene	160	110		50	≤340	
Pyrene	19	340U		321	≤340	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	18	20				
Hexachlorobenzene	170	200		30	≤370	

LDC #: 24047M2G
SDG #: Sulfur

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: NG
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	9/7/2010	1,4-Dioxane	(IS1)	0.6211	0.6211	0.6078	0.6078	4.6	4.60
	MSS Y		Naphthalene	(IS2)	1.0905	1.0905	1.1045	1.1045	2.1	2.14
			Fluorene	(IS3)	1.2364	1.2364	1.2854	1.2854	5.5	5.51
			Hexachlorobenzene	(IS4)	0.2096	0.2096	0.2150	0.2150	6.4	6.44
			Chrysene	(IS5)	1.1090	1.1090	1.1025	1.1025	2.7	2.65
			Benzo(g,h,i)perylene	(IS6)	0.9979	0.9979	1.0022	1.0022	9.8	9.82

Conc IS/Cpd	Area cpd	Area IS
40/50	211270	272113
40/50	1452752	1065726
40/50	1038301	671801
40/50	275363	1051118
40/50	1443358	1041159
40/50	1067705	855935

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00		1.0765	1.2003		1.0903	0.8090
10.00	0.6455	1.0884	1.2284	0.1920	1.0698	0.9296
20.00	0.5733	1.0785	1.2225	0.2033	1.0870	0.9649
50.00	**0.6211**	**1.0905**	**1.2364**	**0.2096**	**1.1090**	**0.9979**
80.00	0.6367	1.1224	1.3100	0.2235	1.1499	1.0699
120.00	0.5993	1.1231	1.3577	0.2215	1.0926	1.0746
160.00	0.6021	1.1381	1.3567	0.2235	1.1424	1.0836
200.00	0.5769	1.1181	1.3713	0.2314	1.0792	1.0883
X =	0.6078	1.1045	1.2854	0.2150	1.1025	1.0022
S =	0.0279	0.0236	0.0709	0.0138	0.0292	0.0985

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 #: 24047 M2a
SDG #: Sun Cmev

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	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 # 34047 mra

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	Y4788	09/09/10	1,4-Dioxane	(IS1)	0.6078	0.6320	0.6320	4.0	4.0
			Naphthalene	(IS2)	1.1045	1.1416	1.1416	3.4	3.4
			Fluorene	(IS3)	1.2854	1.3272	1.3272	3.3	3.3
			Hexachlorobenzene	(IS4)	0.2150	0.2221	0.2221	3.3	3.3
			Chrysene	(IS5)	1.1025	1.1718	1.1718	6.3	6.3
			Benzo(g,h,i)perylene	(IS6)	1.0022	1.0318	1.0318	2.9	2.9
2	Y4836	09/10/10	1,4-Dioxane	(IS1)	0.6078	0.6535	0.6535	7.5	7.5
			Naphthalene	(IS2)	1.1045	1.1494	1.1494	4.1	4.1
			Fluorene	(IS3)	1.2854	1.3478	1.3478	4.9	4.9
			Hexachlorobenzene	(IS4)	0.2150	0.2416	0.2416	12.4	12.4
			Chrysene	(IS5)	1.1025	1.1377	1.1377	3.2	3.2
			Benzo(g,h,i)perylene	(IS6)	1.0022	0.9672	0.9672	3.5	3.5

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	297038	234991	293253	224375
Naphthalene	(IS2)	40/80	2066321	904989	1977504	860218
Fluorene	(IS3)	40/80	1486157	559884	1512241	561014
Hexachlorobenzene	(IS4)	40/80	398387	896746	442594	915793
Chrysene	(IS5)	40/80	1953523	833558	1994638	876639
Benzo(g,h,i)perylene	(IS6)	40/80	1333281	646123	1187355	613808

LDC #24047M2a

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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	K6193	09/09/10	1,4-Dioxane	(IS1)	0.5795	0.5841	0.5841	0.8	0.8
			Naphthalene	(IS2)	1.0015	1.0152	1.0152	1.4	1.4
			Fluorene	(IS3)	1.2421	1.2642	1.2642	1.8	1.8
			Hexachlorobenzene	(IS4)	0.2313	0.2327	0.2327	0.6	0.6
			Chrysene	(IS5)	1.0679	1.0666	1.0666	0.1	0.1
			Benzo(g,h,i)perylene	(IS6)	1.0199	1.0547	1.0547	3.4	3.4

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	263848	225842
Naphthalene	(IS2)	40/80	1781060	877199
Fluorene	(IS3)	40/80	1311374	518654
Hexachlorobenzene	(IS4)	40/80	401614	863117
Chrysene	(IS5)	40/80	1915436	897927
Benzo(g,h,i)perylene	(IS6)	40/80	1979145	938251

LDC #: 24047M2a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	66.3	66	66	0
2-Fluorobiphenyl	↓	66.8	67	67	
Terphenyl-d14	↓	97.6	98	98	
Phenol-d5	150	106.7	71	71	
2-Fluorophenol	↓	101.8	68	68	
2,4,6-Tribromophenol	↓	99.6	66	66	↓
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 #: 24047 M2a

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

Reviewer: JV
2nd Reviewer: JV

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 - ~~29038~~ 29938/2-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	2670	NA	2000	NA	75	75				
Pentachlorophenol										
Pyrene	2670		2310		87	87				

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 #: 24047M29

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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. #11 , SS :

Conc. = $\frac{(16473)(40)(1\ ml)(1000)(\ )}{(844707)(0.2150)(31.4\ g)(0.914)(\ )}$

= 126.4

≈ 130 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 27, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6886-1

Sample Identification

BDT-1-N-20-10BPC	BDT-1-N-10-4BPC	BDT-1-N-10-2BPCMS
BDT-1-N-20-12BPC**	BDT-1-N-10-6BPC	BDT-1-N-10-2BPCMSD
BDT-1-N-20-14BPC	BDT-1-N-10-8BPC	BDT-1-N-15-4BPCMS
BDT-1-N-20-2BPC	BDT-1-N-10-8BPC_FD	BDT-1-N-15-4BPCMSD
BDT-1-N-20-4BPC	BDT-1-N-15-10BPC	BDT-1-S-20-4BPCMS
BDT-1-N-20-6BPC	BDT-1-N-15-12BPC	BDT-1-S-20-4BPCMSD
BDT-1-N-20-8BPC	BDT-1-N-15-14BPC**	BDT-1-S-20-6BPCMS
BDT-1-N-20-10BPC_FD	BDT-1-N-15-8BPC	BDT-1-S-20-6BPCMSD
BDT-1-N-5-10BPC	BDT-1-N-15-2BPC	
BDT-1-N-5-12BPC	BDT-1-N-15-4BPC	
BDT-1-N-5-14BPC	BDT-1-N-15-6BPC	
BDT-1-N-5-8BPC_FD	BDT-1-S-20-10BPC	
BDT-1-N-5-8BPC	BDT-1-S-20-12BPC	
BDT-1-N-5-2BPC	BDT-1-S-20-14BPC**	
BDT-1-N-5-4BPC	BDT-1-S-20-2BPC	
BDT-1-N-5-6BPC	BDT-1-S-20-4BPC	
BDT-1-N-10-10BPC	BDT-1-S-20-6BPC	
BDT-1-N-10-12BPC	BDT-1-S-20-8BPC	
BDT-1-N-10-14BPC	BDT-1-S-20-14BPC_FD	
BDT-1-N-10-2BPC	EB-08272010	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 47 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.

Sample EB-08272010 was identified as an equipment blank. No semivolatile contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

All 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 280-6886-1	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-N-20-10BPC and BDT-1-N-20-10BPC_FD, samples BDT-1-N-5-8BPC_FD and BDT-1-N-5-8BPC, samples BDT-1-N-10-8BPC and BDT-1-N-10-8BPC_FD, and samples BDT-1-S-20-14BPC** and BDT-1-S-20-14BPC_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-N-10-8BPC	BDT-1-N-10-8BPC_FD				
Hexachlorobenzene	130	180	-	50 (≤350)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-6886-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6886-1	BDT-1-N-20-10BPC BDT-1-N-20-12BPC** BDT-1-N-20-14BPC BDT-1-N-20-2BPC BDT-1-N-20-4BPC BDT-1-N-20-6BPC BDT-1-N-20-8BPC BDT-1-N-20-10BPC_FD BDT-1-N-5-10BPC BDT-1-N-5-12BPC BDT-1-N-5-14BPC BDT-1-N-5-8BPC_FD BDT-1-N-5-8BPC BDT-1-N-5-2BPC BDT-1-N-5-4BPC BDT-1-N-5-6BPC BDT-1-N-10-10BPC BDT-1-N-10-12BPC BDT-1-N-10-14BPC BDT-1-N-10-2BPC BDT-1-N-10-4BPC BDT-1-N-10-6BPC BDT-1-N-10-8BPC BDT-1-N-10-8BPC_FD BDT-1-N-15-10BPC BDT-1-N-15-12BPC BDT-1-N-15-14BPC** BDT-1-N-15-8BPC BDT-1-N-15-2BPC BDT-1-N-15-4BPC BDT-1-N-15-6BPC BDT-1-S-20-10BPC BDT-1-S-20-12BPC BDT-1-S-20-14BPC** BDT-1-S-20-2BPC BDT-1-S-20-4BPC BDT-1-S-20-6BPC BDT-1-S-20-8BPC BDT-1-S-20-14BPC_FD EB-08272010	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 280-6886-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-6886-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N2a
SDG #: 280-6886-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 2
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: 8/27/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1^* = 1,8 D_2^* = 12,13 D_3 = 23,24 D_4^* = 31,39
XVII.	Field blanks	AWP	EB = *40 ~~PB = FB-0413 2010- RIG2= RZE~~ (from 280-2700=2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil + Water

1	BDT-1-N-20-10BPC	D1, S	11	BDT-1-N-5-14BPC	S	21	BDT-1-N-10-4BPC	S	31	BDT-1-N-15-6BPC	S
2	BDT-1-N-20-12BPC**		12	BDT-1-N-5-8BPC_FD	D1	22	BDT-1-N-10-6BPC		32	BDT-1-S-20-10BPC	
3	BDT-1-N-20-14BPC		13	BDT-1-N-5-8BPC	D2	23	BDT-1-N-10-8BPC	D3	33	BDT-1-S-20-12BPC	
4	BDT-1-N-20-2BPC		14	BDT-1-N-5-2BPC		24	BDT-1-N-10-8BPC_FD	D3	34	BDT-1-S-20-14BPC**	D4
5	BDT-1-N-20-4BPC		15	BDT-1-N-5-4BPC		25	BDT-1-N-15-10BPC		35	BDT-1-S-20-2BPC	
6	BDT-1-N-20-6BPC		16	BDT-1-N-5-6BPC		26	BDT-1-N-15-12BPC		36	BDT-1-S-20-4BPC	
7	BDT-1-N-20-8BPC		17	BDT-1-N-10-10BPC		27	BDT-1-N-15-14BPC**		37	BDT-1-S-20-6BPC	
8	BDT-1-N-20-10BPC_FD	D1	18	BDT-1-N-10-12BPC		28	BDT-1-N-15-8BPC		38	BDT-1-S-20-8BPC	
9	BDT-1-N-5-10BPC		19	BDT-1-N-10-14BPC		29	BDT-1-N-15-2BPC		39	BDT-1-S-20-14BPC_FD	D4
10	BDT-1-N-5-12BPC		20	BDT-1-N-10-2BPC		30	BDT-1-N-15-4BPC		40	EB-08272010	W

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N2a
SDG #: 280-6886-1
Laboratory: Test America

Date: 10/05/10
Page: 2 of 2
Reviewer: NV
2nd Reviewer: [illegible]

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		Sampling dates:
II.	GC/MS Instrument performance check		
III.	Initial calibration		
IV.	Continuing calibration/ICV		
V.	Blanks		see page 1
VI.	Surrogate spikes		
VII.	Matrix spike/Matrix spike duplicates		
VIII.	Laboratory control samples		
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards		
XI.	Target compound identification		Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs		Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)		Not reviewed for Stage 2B validation.
XIV.	System performance		Not reviewed for Stage 2B validation.
XV.	Overall assessment of data		
XVI.	Field duplicates		
XVII.	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

41	BDT-1-N-10-2BPCMS S	51	MB 280-30861/1-A	61		71	
42	BDT-1-N-10-2BPCMSD	52	MB 280-30899/1-A	62		72	
43	BDT-1-N-15-4BPCMS	53	MB 280-30764/1-A	63		73	
44	BDT-1-N-15-4BPCMSD	54	MB 280-29647/1-A	64		74	
45	BDT-1-S-20-4BPCMS	55		65		75	
46	BDT-1-S-20-4BPCMSD	56		66		76	
47	BDT-1-S-20-6BPCMS	57		67		77	
48	BDT-1-S-20-6BPCMSD	58		68		78	
49		59		69		79	
50		60		70		80	

LDC #: 24047 N2a

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. 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 #: 24047N2a

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
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 #: 24647 N2a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JV6
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
		43/44	SS	252 (51-120)	284 (51-120)	( )	30	No qual (LCS 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 #: 24047 N2a

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
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 LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS 280-30061/2-A	RRR	20 (23-120)	( )	( )		No qual (MS, MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 24047N2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SV
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)
	23	24				
Hexachlorobenzene	130	180		50	≤350	

V:\FIELD DUPLICATES\24047N2a.wpd

LDC #: 24047 N2a
SDG #: Sa Cov

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	9/7/2010	1,4-Dioxane (IS1)	0.6211	0.6211	0.6078	0.6078	4.6	4.60
	MSS Y		Naphthalene (IS2)	1.0905	1.0905	1.1045	1.1045	2.1	2.14
			Fluorene (IS3)	1.2364	1.2364	1.2854	1.2854	5.5	5.51
			Hexachlorobenzene (IS4)	0.2096	0.2096	0.2150	0.2150	6.4	6.44
			Chrysene (IS5)	1.1090	1.1090	1.1025	1.1025	2.7	2.65
			Benzo(g,h,i)perylene (IS6)	0.9979	0.9979	1.0022	1.0022	9.8	9.82

Conc IS/Cpd	Area cpd	Area IS
40/50	211270	272113
40/50	1452752	1065726
40/50	1038301	671801
40/50	275363	1051118
40/50	1443358	1041159
40/50	1067705	855935

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00		1.0765	1.2003		1.0903	0.8090
10.00	0.6455	1.0884	1.2284	0.1920	1.0698	0.9296
20.00	0.5733	1.0785	1.2225	0.2033	1.0870	0.9649
50.00	**0.6211**	**1.0905**	**1.2364**	**0.2096**	**1.1090**	**0.9979**
80.00	0.6367	1.1224	1.3100	0.2235	1.1499	1.0699
120.00	0.5993	1.1231	1.3577	0.2215	1.0926	1.0746
160.00	0.6021	1.1381	1.3567	0.2235	1.1424	1.0836
200.00	0.5769	1.1181	1.3713	0.2314	1.0792	1.0883
X =	0.6078	1.1045	1.2854	0.2150	1.1025	1.0022
S =	0.0279	0.0236	0.0709	0.0138	0.0292	0.0985

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 #: 24047 N29

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	8/30/2010	1,4-Dioxane (IS1)	0.6494	0.6494	0.6538	0.6538	3.2	3.21
	MSS B		Naphthalene (IS2)	1.0810	1.0810	1.0482	1.0482	11.0	11.01
			Fluorene (IS3)	1.3696	1.3696	1.3037	1.3037	11.0	10.98
			Hexachlorobenzene (IS4)	0.2517	0.2517	0.2454	0.2454	3.8	3.76
			Chrysene (IS5)	1.1455	1.1455	1.0975	1.0975	8.1	8.10
			Benzo(g,h,i)perylene (IS6)	1.1162	1.1162	1.0926	1.0927	2.5	2.49

nc IS/Cpd	Area cpd	Area IS
40/50	199862	246217
40/50	1299821	961965
40/50	956646	558782
40/50	297546	945857
40/50	1516369	1059049
40/50	1447002	1037135

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6780	1.1880	1.4403	0.2501	1.1731	1.0576
10.00	0.6510	1.1590	1.4246	0.2516	1.1774	1.0704
20.00	0.6855	1.1306	1.4342	0.2514	1.1786	1.0855
50.00	**0.6494**	**1.0810**	**1.3696**	**0.2517**	**1.1455**	**1.1162**
80.00	0.6655	1.0601	1.3277	0.2522	1.1198	1.1433
120.00	0.6423	0.9839	1.2284	0.2435	1.0281	1.1029
160.00	0.6276	0.9020	1.1307	0.2339	1.0006	1.0822
200.00	0.6313	0.8811	1.0742	0.2287	0.9572	1.0831
X =	0.6538	1.0482	1.3037	0.2454	1.0975	1.0927
S =	0.0210	0.1154	0.1432	0.0092	0.0889	0.0273

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 #24047 N2a

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: W

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	B0206	09/10/10	1,4-Dioxane	(IS1)	0.6538	0.6341	0.6341	3.0	3.0
	MSS B		Naphthalene	(IS2)	1.0482	1.0565	1.0565	0.8	0.8
			Fluorene	(IS3)	1.3037	1.3158	1.3158	0.9	0.9
			Hexachlorobenzene	(IS4)	0.2454	0.2311	0.2311	5.8	5.8
			Chrysene	(IS5)	1.0975	1.0837	1.0837	1.3	1.3
			Benzo(g,h,i)perylene	(IS6)	1.0926	1.1305	1.1305	3.5	3.5
2	Y4836	09/10/10	1,4-Dioxane	(IS1)	0.6078	0.6535	0.6535	7.5	7.5
	MSS Y		Naphthalene	(IS2)	1.1045	1.1494	1.1494	4.1	4.1
			Fluorene	(IS3)	1.2854	1.3478	1.3478	4.9	4.9
			Hexachlorobenzene	(IS4)	0.2150	0.2416	0.2416	12.4	12.4
			Chrysene	(IS5)	1.1025	1.1377	1.1377	3.2	3.2
			Benzo(g,h,i)perylene	(IS6)	1.0022	0.9672	0.9672	3.5	3.5

Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	307194	242234	293253	224375
Naphthalene	(IS2)	40/80	2005560	949171	1977504	860218
Fluorene	(IS3)	40/80	1455116	552933	1512241	561014
Hexachlorobenzene	(IS4)	40/80	437837	947113	442594	915793
Chrysene	(IS5)	40/80	2166684	999630	1994638	876639
Benzo(g,h,i)perylene	(IS6)	40/80	2284745	1010468	1187355	613808

LDC #: 24047 N>9

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	64.9	65	65	0
2-Fluorobiphenyl	↓	67.9	68	68	↓
Terphenyl-d14	↓	75.4	75	75	↓
Phenol-d5	150	100.6	67	67	↓
2-Fluorophenol	↓	95.3	64	64	↓
2,4,6-Tribromophenol	↓	95.1	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 #: 24047 N2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: 43/44

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	2720	0	1920	1810	70	70	67	67	5	6
Pentachlorophenol											
Pyrene	2740	2720		1120	1060	87	87	83	83	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 #: 24047 N29

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

LCS/LCSD samples: LCS 250 30061 /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	2510	NA	1640	NA	65	65				
Pentachlorophenol		↓		↓						
Pyrene	2510	↓	1870	↓	74	74				

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 #: 24047 N2A

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

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. #27 , SS :

Conc. = $\frac{(24510)(40)(1\ ml)(100)(\quad)}{(768976)(0.2150)(30.1\ g)(0.907)(\quad)}$

= 217. r

≈ 220 ug/kg

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

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Data Validation Reports
LDC #24047

Chlorinated Pesticides

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 7 through August 9, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6223-1

Sample Identification

SSAJ3-02-12BPC
SSAJ3-02-15BPC
SSAJ3-02-8BPC**
SSAJ3-02-8BPC_FD
EB-08072010
SSAI3-04-14BPC
SSAI3-04-14BPC_FD
SSAI3-02-11BPC
SSAI3-02-14BPC
SSAI3-02-5BPC_FD
SSAI3-03-11BPC
SSAI3-03-14BPC
SSAI3-02-1BPC
SSAI3-02-5BPC
SSAI3-02-8BPC
SSAI3-03-1BPC
SSAI3-03-5BPC**
SSAI3-03-8BPC
SSAI3-03-8BPCMS
SSAI3-03-8BPCMSD

**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 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.

Sample EB-08072010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
EB-08072010	RTI-XLB RTI-35	Decachlorobiphenyl Decachlorobiphenyl	24 (34-122) 22 (34-122)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6223-1	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 SSAJ3-02-8BPC** and SSAJ3-02-8BPC_FD, samples SSAI3-04-14BPC and SSAI3-04-14BPC_FD, and samples SSAI3-02-5BPC_FD and SSAI3-02-5BPC were identified as field duplicates. No chlorinated pesticides were detected.

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6223-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6223-1	EB-08072010	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Surrogate recovery (%R) (s)
280-6223-1	SSAJ3-02-12BPC SSAJ3-02-15BPC SSAJ3-02-8BPC** SSAJ3-02-8BPC_FD EB-08072010 SSAI3-04-14BPC SSAI3-04-14BPC_FD SSAI3-02-11BPC SSAI3-02-14BPC SSAI3-02-5BPC_FD SSAI3-03-11BPC SSAI3-03-14BPC SSAI3-02-1BPC SSAI3-02-5BPC SSAI3-02-8BPC SSAI3-03-1BPC SSAI3-03-5BPC** SSAI3-03-8BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047B3a
SDG #: 280-6223-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: ✓

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: 8/07-09/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% r
IV.	Continuing calibration/ICV	A	ccv/icv ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	ND	D_1 = 3,4 D_2 = 6,7 D_3 = 14, 10
XV.	Field blanks	ND	EB = 5 ~~FB = FB-08072010-RZD~~ (280-22162)

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	SSAJ3-02-12BPC	S	11	SSAI3-03-11BPC	S	21	MB 280-26587/1-A	31			
2	SSAJ3-02-15BPC		12	SSAI3-03-14BPC		22	MB 280-26588/1-A	32			
3	SSAJ3-02-8BPC**	D_1	13	SSAI3-02-1BPC		23		33			
4	SSAJ3-02-8BPC_FD	D_1	14	SSAI3-02-5BPC	D_3	24		34			
5	EB-08072010	W	15	SSAI3-02-8BPC		25		35			
6	SSAI3-04-14BPC	D_2 S	16	SSAI3-03-1BPC		26		36			
7	SSAI3-04-14BPC_FD	D_2	17	SSAI3-03-5BPC**		27		37			
8	SSAI3-02-11BPC		18	SSAI3-03-8BPC		28		38			
9	SSAI3-02-14BPC		19	SSAI3-03-8BPCMS		29		39			
10	SSAI3-02-5BPC_FD	D_3	20	SSAI3-03-8BPCMSD		30		40			

LDC #: 24047 B3a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [signature]

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 #: 24047 B3A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: V

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 #: 24047 B3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVG
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
		5	RTX-XLB	B	24 (39-123)	J- /MJ /P (5)
			RTI-35	↓	22 (↓)	↓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC # 24647 B3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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 # 24047 B39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	4,4'-DDT	33015.00	4.00		8253.75
			78046.00	10.00		7804.60
	GCS_P2		193282.00	25.00		7731.28
			386784.00	50.00		7735.68
			581766.00	75.00		7756.88
			756268.00	100.00		7562.68

Ave RF 7807.48

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		5851.33656		
R Squared		0.99959	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	7650.960458	-1.270906	b =	7636.000000
Std Err of Coef.	42.600546	0.79		

LDC # 24057 B3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	4,4'-DDT	59795.00	4.00	16.00	14949
			137046.00	10.00	100.00	13705
	GCS_P2		321682.00	25.00	625.00	12867
			607290.00	50.00	2500.00	12146
			883436.00	75.00	5625.00	11779
			1123921.00	100.00	10000.00	11239
					Ave RF	12781

Regression Output:			Reported	
Constant		8705.27176	c =	NR
Std Err of Y Est		3439.22112		
R Squared		0.99996	r2 =	0.999990
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	12932.023828	-17.656945	b =	NR
Std Err of Coef.	164.371396	1.57		

LDC # 24047 B3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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 #24097B39

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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

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	018F1801	8/17/2010 20:42	HCB CLP1	50	50.1	50.8	0.2	1.5
			4,4'-DDT CLP1	50	49.7	50.0	0.7	0.0
			HCB CLP2	50	48.7	48.7	2.7	2.6
			4,4'-DDT CLP2	50	46.5	46.6	6.9	6.8
2	044F4401	8/18/2010 3:50	HCB CLP1	50	50.9	52.3	1.8	4.6
			4,4'-DDT CLP1	50	49.3	53.9	1.3	7.8
			HCB CLP2	50	49.5	49.6	0.9	0.9
			4,4'-DDT CLP2	50	48.3	48.4	3.4	3.3
3								
4								
5								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area			
HCB CLP1	9638	489215	503972			
DDT CLP1	7636	381691	411700			

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	877416	-29.504	19034.789	20708.902	48.681		-856707.098	261218047.4	16162.2414	48.6806465	596.478959
CCV1 ddt CLP2	573059	-17.657	12932.024	8705.272	46.606		-564353.728	127378069.6	11286.1893	46.6057277	685.796379
CCV2 HCB CLP2	891715	-29.504	19034.789	20708.902	49.567		-871006.098	259530536.6	16109.9515	49.5667964	595.592809
CCV2 ddt CLP2	592873	-17.657	12932.024	8705.272	48.366		-584167.728	125978646.4	11224.021	48.3661733	684.035934

LDC #: 24047B3a

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	18.0	90	90	0
Tetrachloro-m-xylene	2		17.4	87	87	
Decachlorobiphenyl	1		20.1	101	101	
Decachlorobiphenyl	2		18.9	95	95	

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 #: 24047 B3a

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: 19 /20

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	0	15.35	16.17	86	86	91	91	5	5
4,4'-DDT	↓	↓	↓	16.00	16.79	90	90	95	95	5	5
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 #: 24047B3a

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

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 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 280-26587/2-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	16.0	NA	14.1	NA	88	88				
4,4'-DDT	16.0	↓	14.6	↓	91	91				
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 #: 24047 B3a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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. _____ ~~ND~~:

Conc. = (_____)
( )

=

#	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 10, 2010

LDC Report Date: October 13, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6345-1

Sample Identification

SSAJ3-07-SW-E-1BPC**
SSAJ3-05-SW-E-1BPC
SSAJ3-02-SW-E-1BPC
SSAI3-04-SW-E-1BPC
SSAI3-03-SW-E-1BPC
SSAI3-02-SW-E-1BPC_FD
SSAI3-02-SW-E-1BPC
SSAI3-02-SW-W-1BPC
SSAI3-03-SW-W-1BPC
SSAI3-04-SW-W-1BPC
SSAJ3-02-SW-W-1BPC
SSAJ3-05-SW-W-1BPC
SSAJ3-07-SW-W-1BPC**
SSAJ3-07-SW-W-1BPC_FD
SB01-24BPC
SB02-24BPC
SSAJ3-02-SW-W-1BPCMS
SSAJ3-02-SW-W-1BPCMSD

**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 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
8/26/10	019F1901	CLP2	gamma-BHC	23.1	SSAI3-04-SW-W-1BPC	J+ (all detects)	A
			Heptachlor	23.8	SSAJ3-02-SW-W-1BPC	J+ (all detects)	
			gamma-Chlordane	20.3	SSAJ3-05-SW-W-1BPC	J+ (all detects)	
			Endosulfan sulfate	20.4	SSAJ3-07-SW-W-1BPC**	J+ (all detects)	
			Endrin ketone	73.9	SSAJ3-07-SW-W-1BPC_FD	J+ (all detects)	
					SSAJ3-02-SW-W-1BPCMS		
					SSAJ3-02-SW-W-1BPCMSD		

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
SSAJ3-05-SW-E-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	386 (63-124) 387 (63-124)	All TCL compounds except 4,4'-DDE beta-BHC Hexachlorobenzene	J+ (all detects)	A
SSAJ3-02-SW-E-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	619 (63-124) 624 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT beta-BHC Hexachlorobenzene	J+ (all detects)	A
SSAI3-04-SW-E-1BPC	CLP1 CLP2 CLP2	Decachlorobiphenyl Tetrachloro-m-xylene Decachlorobiphenyl	354000 (63-124) 0 (59-115) 59000 (63-124)	4,4'-DDD Aldrin alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endrin Endrin aldehyde gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide	J (all detects) UJ (all non-detects)	A
SSAI3-03-SW-E-1BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	137 (59-115) 0 (59-115) 86700 (63-124) 25100 (63-124)	All TCL compounds except Hexachlorobenzene Toxaphene Endosulfan sulfate 4,4'-DDE 4,4'-DDT	J (all detects) UJ (all non-detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAI3-02-SW-E-1BPC_FD	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	212 (59-115) 0 (59-115) 31900 (63-124) 14100 (63-124)	All TCL compounds except 4,4'-DDT Hexachlorobenzene Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A
SSAI3-02-SW-E-1BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	222 (59-115) 0 (59-115) 29900 (63-124) 12800 (63-124)	All TCL compounds except 4,4'-DDT Endosulfan sulfate Hexachlorobenzene Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A
SSAI3-02-SW-W-1BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	238 (59-115) 0 (59-115) 166000 (63-124) 40300 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT Endosulfan sulfate Hexachlorobenzene Toxaphene	J (all detects) UJ (all non-detects)	A
SSAI3-03-SW-W-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	915 (63-124) 933 (63-124)	All TCL compounds except Hexachlorobenzene Toxaphene	J+ (all detects)	A
SSAI3-04-SW-W-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	4770 (63-124) 3880 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT beta-BHC Hexachlorobenzene Toxaphene	J+ (all detects)	A
SSAJ3-02-SW-W-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	378 (63-124) 406 (63-124)	All TCL compounds except beta-BHC Hexachlorobenzene	J+ (all detects)	A
SSAJ3-05-SW-W-1BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	259 (63-124) 273 (63-124)	All TCL compounds except Hexachlorobenzene beta-BHC	J+ (all detects)	A
SSAJ3-07-SW-W-1BPC**	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	553 (63-124) 568 (63-124)	All TCL compounds except Hexachlorobenzene beta-BHC	J+ (all detects)	A
SSAJ3-07-SW-W-1BPC_FD	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	642 (63-124) 660 (63-124)	All TCL compounds except Hexachlorobenzene beta-BHC	J+ (all detects)	A
SB01-24BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	265 (59-115) 255 (59-115) 2170 (63-124) 3040 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT alpha-BHC Hexachlorobenzene	J+ (all detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SB02-24BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	753 (59-115) 1100 (59-115) 12200 (63-124) 32400 (63-124)	All TCL compounds except 4,4'-DDD 4,4'-DDE 4,4'-DDT beta-BHC 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) and relative percent differences (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 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
SSAJ3-07-SW-W-1BPC**	alpha-BHC delta-BHC	69.3 142.2	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 280-6345-1	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 SSAI3-02-SW-E-1BPC and SSAI3-02-SW-E-1BPC_FD and samples SSAJ3-07-SW-W-1BPC** and SSAJ3-07-SW-W-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
	SSAI3-02-SW-E-1BPC	SSAI3-02-SW-E-1BPC_FD				
4,4'-DDE	22	27	20 (≤50)	-	-	-
alpha-BHC	16	17	6 (≤50)	-	-	-
Endosulfan sulfate	3400U	33	-	3367 (≤3400)	-	-
Hexachlorobenzene	36000	42000	15 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-07-SW-W-1BPC**	SSAJ3-07-SW-W-1BPC_FD				
4,4'-DDE	17	18	6 (≤50)	-	-	-
4,4'-DDT	6.0	8.1	-	2.1 (≤1.7)	J (all detects)	A
alpha-BHC	0.86	0.62	-	0.24 (≤1.7)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-07-SW-W-1BPC**	SSAJ3-07-SW-W-1BPC_FD				
delta-BHC	1.7	1.8	-	0.1 (≤1.7)	-	-
Endosulfan sulfate	1.7U	0.38	-	1.32 (≤1.7)	-	-
beta-BHC	290	260	11 (≤50)	-	-	-
Hexachlorobenzene	260	230	12 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6345-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6345-1	SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD	gamma-BHC Heptachlor gamma-Chlordane Endosulfan sulfate Endrin ketone	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
280-6345-1	SSAJ3-05-SW-E-1BPC	All TCL compounds except 4,4'-DDE beta-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAJ3-02-SW-E-1BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT beta-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAI3-04-SW-E-1BPC	4,4'-DDD Aldrin alpha-Chlordane Chlordane (Technical) delta-BHC Dieldrin Endosulfan I Endosulfan II Endrin Endrin aldehyde gamma-BHC gamma-Chlordane Heptachlor Heptachlor epoxide	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAI3-03-SW-E-1BPC SSAI3-02-SW-W-1BPC	All TCL compounds except Hexachlorobenzene Toxaphene Endosulfan sulfate 4,4'-DDE 4,4'-DDT	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAI3-02-SW-E-1BPC_FD	All TCL compounds except 4,4'-DDT Hexachlorobenzene Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAI3-02-SW-E-1BPC	All TCL compounds except 4,4'-DDT Endosulfan sulfate Hexachlorobenzene Methoxychlor Toxaphene	J (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6345-1	SSAI3-03-SW-W-1BPC	All TCL compounds except Hexachlorobenzene Toxaphene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAI3-04-SW-W-1BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT beta-BHC Hexachlorobenzene Toxaphene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD	All TCL compounds except beta-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SB01-24BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT alpha-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SB02-24BPC	All TCL compounds except 4,4'-DDD 4,4'-DDE 4,4'-DDT beta-BHC Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6345-1	SSAJ3-07-SW-W-1BPC**	alpha-BHC delta-BHC	J (all detects) J (all detects)	A	Project Quantitation Limit (RPD)(dc)
280-6345-1	SSAJ3-07-SW-E-1BPC** SSAJ3-05-SW-E-1BPC SSAJ3-02-SW-E-1BPC SSAI3-04-SW-E-1BPC SSAI3-03-SW-E-1BPC SSAI3-02-SW-E-1BPC_FD SSAI3-02-SW-E-1BPC SSAI3-02-SW-W-1BPC SSAI3-03-SW-W-1BPC SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD SB01-24BPC SB02-24BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6345-1	SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD	4,4'-DDT	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6345-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6345-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047E3a
SDG #: 280-6345-1
Laboratory: Test America

Date: 10/12/10
Page: 1 of 1
Reviewer: VC
2nd Reviewer: [illegible]

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: 8/10/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20 % or
IV.	Continuing calibration/ICV	SW	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_1 = 7, 6 D_2 = 13, 14
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	SSAJ3-07-SW-E-1BPC**	11	SSAJ3-02-SW-W-1BPC	21	MB 280-27469/1-A	31	
2	SSAJ3-05-SW-E-1BPC	12	SSAJ3-05-SW-W-1BPC	22	MB 280-28995/1-A	32	
3	SSAJ3-02-SW-E-1BPC	13	SSAJ3-07-SW-W-1BPC ** D_2	23		33	
4	SSAI3-04-SW-E-1BPC	14	SSAJ3-07-SW-W-1BPC_FD D_2	24		34	
5	SSAI3-03-SW-E-1BPC	15	SB01-24BPC	25		35	
6	SSAI3-02-SW-E-1BPC_FD D_1	16	SB02-24BPC	26		36	
7	SSAI3-02-SW-E-1BPC D_1	17	SSAJ3-02-SW-W-1BPCMS	27		37	
8	SSAI3-02-SW-W-1BPC	18	SSAJ3-02-SW-W-1BPCMSD	28		38	
9	SSAI3-03-SW-W-1BPC	19		29		39	
10	SSAI3-04-SW-W-1BPC	20		30		40	

LDC #: 24047 E79

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
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 #: 47047E39

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
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 #: 24047 E39

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
	8/26/10	019F1901	CLPY	D (+)	23.1	( )	10-14, 17, 18	J+ dets (c)
			B	E (+)	23.8	( )		
				T (+)	20.3	( )		
				N (+)	20.4	( )		
				Q (+)	73.9	( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

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. Hexachlorobenzene
FF.
GG.
HH.
II.
JJ.

LDC #: 24047 E3G

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 6
Reviewer: MG
2nd Reviewer: L

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	386 (63-124)	J+ dets /A (S) (all except J, B, ~~FF~~)
			2		387 ( )	
		2(5x)	1		345 ( )	No qual
			2		358 ( )	
		3	1		619 ( )	J+ dets /A (S) (all except J, O, B, ~~FF~~)
			2		624 ( )	
		3(10x)	1		550 ( )	No qual
			2		562 ( )	
		4	1	B	359000 ( )	~~I+ dets A~~ J/~~NJ~~/A (S) (*)
			2	A	0 (59-115)	
			2	B	59000 (63-124)	
		4 (5000x)	1	A	0 (59-115)	No qual
			1		0 ( )	
			2	B	72300 (63-124)	
			2		67700 ( )	

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

* qual M, F, S, HH, C, I, H, L, K, R, D, T, E, G

LDC #: 24047E39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JVG
2nd Reviewer: CA

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
		5	CLP 1	A	137 (59-115)	J/UJ/A (S) (all except FF, U, N, J, O)
			2	↓	0 (↓)	↓
			1	B	86700 (63-124)	
			2	↓	2516 (↓)	↓
					( )	
		5 (5000X)	1	A	0 (59-115)	No qual
			2	↓	0 (↓)	↓
			1	B	19500 (63-124)	
			2	↓	1540 (↓)	↓
					( )	
		6	1	A	212 (59-115)	J/UJ/A (S) (all except O, FF, P, U)
			2	↓	0 (↓)	↓
			1	B	31900 (63-124)	
			2	↓	1410 (↓)	↓
					( )	
		6 (2000X)	1	A	0 (59-115)	No qual
			2	A	0 (↓)	↓
			1	B	10600 (63-124)	
			2	B	~~9106~~ 9110 (↓)	↓
					( )	

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

LDC #: 24047 E3A

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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
		7	CLP 1	A	222 (59-115)	J /UJ/A (S) (all except O, N, FF, P, U)
			2	A	~~299~~ 0 (↓)	↓
			1	B	29900 (63-124)	
			2	↓	12800 (↓)	↓
					( )	
		7 (2000x)	1	A	0 (59-115)	No qual
			2	↓	0 (↓)	↓
			1	B	10400 (63-124)	
			2	↓	8980 (↓)	↓
					( )	
		8	1	A	238 (59-115)	J /UJ/A (S) (all except J, O, N, FF, U)
			2	↓	0 (↓)	↓
			1	B	166000 (63-124)	
			2	↓	40300 (↓)	↓
					( )	
		8 (5000x)	1	A	0 (59-115)	No qual
			2	↓	0 (↓)	↓
			1	B	39600 (63-124)	
			2	↓	35100 (↓)	↓
					( )	

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

LDC #: 24047 E3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JC
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
		9	cup 1	B	915 (63-124)	J+ dets/A (S) (all except FF, U)
			2	↓	933 (↓)	↓
					( )	
		9 (100X)	1	A	0 (59-115)	No qual
			2	↓	0 (↓)	↓
			1	B	598 (63-124)	
			2	↓	522 (↓)	
					( )	
		10	1	B	4770 ( )	J+ dets/A (S) (all except J, O, B, FF, U)
			2	↓	3880 (↓)	↓
					( )	
		10 (50X)	1	A	0 (59-115)	No qual
			2	↓	8 (↓)	↓
			1	B	3450 (63-124)	
			2	↓	3580 (↓)	↓
					( )	
		11	1	B	378 ( )	J+ dets/A (S) (all except B, FF)
			2	↓	406 (↓)	↓
					( )	
		11 (20X)	1	B	329 ( )	No qual
			2	↓	325 (↓)	↓

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

LDC #: 24097E3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JYG
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
		12	CLP 1	B	259 (63-124)	J+ dets/A (S) (all except FF, B)
			2	↓	273 ( )	
					( )	
		12 (5.0x)	1	B	238 ( )	No qual
			2	↓	234 ( )	↓
					( )	
		13	1	B	553 ( )	J+ dets/A (S) (all except FF, B)
			2	↓	568 ( )	↓
					( )	
		13 (20x)	1	B	488 ( )	No qual
			2	↓	503 ( )	↓
					( )	
		14	1	B	642 ( )	J+ dets/A (S) (all except FF, B)
			2	↓	660 ( )	↓
					( )	
		14 (20x)	1	B	583 ( )	No qual
			2	↓	594 (✓)	
					( )	
		15	1	A	265 ~~270~~ (59-115)	J+ dets/A (S) (all except J, O, ~~A~~, FF)
			2	↓	255 ~~265~~ (↓)	↓

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

LDC #: 24047 E7a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JM6
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
		15	C|P 1	B	2170 (63-124)	J+ dets /A (S) (all except J, O, A, FF)
			2	↓	3040 (↓)	↓
					( )	
		15 (100X)	1	A	48 (59-115)	No qual
			2	↓	44 (↓)	
			1	B	2200 (63-124)	
			2	↓	2240 (↓)	
					( )	
		16	1	A	753 (59-115)	J+ dets /A (S) (all except M, J, O, B, FF)
			2	↓	1100 (↓)	
			1	B	12200 (63-124)	
			2	↓	3240J (↓)	
					( )	
		16 (500X)	1	A	141 (59-115)	No qual
			2	↓	13 (↓)	
			1	B	15300 (63-124)	
			2	↓	14700 (↓)	
					( )	
					( )	
					( )	

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

LDC #: 24047 E39
SDG #: Sinclair

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JVG
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 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
		17/18	Several	compounds	outside)	( )	11	No qual
			limits	for %R	and %RPD	( )		(either MS, MSD, LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 24047 E9c
SDG #: Sa Cove

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: 1a

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
	A	13	69.3	J dets/A (dc)
	C	↓	142.2	↓ ↓

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24047E3a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
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)
	7	6				
4,4'-DDE	22	27	20			
alpha-BHC	16	17	6			
Endosulfan sulfate	3400U	33		3367	≤3400	
Hexachlorobenzene	36000	42000	15			

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	7/13	6/14				
4,4'-DDE	17	18	6			
4,4'-DDT	6.0	8.1		2.1	≤1.7	Jdets/A (fd)
alpha-BHC	0.86	0.62		0.24	≤1.7	
delta-BHC	1.7	1.8		0.1	≤1.7	
Endosulfan sulfate	1.7U	0.38		1.32	≤1.7	
beta-BHC	290	260	11			
Hexachlorobenzene	260	230	12			

V:\FIELD DUPLICATES\24047E3a.wpd

LDC # 24047 E3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JW
2nd Reviewer: [illegible]

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 # 24047E3Q

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVZ
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 # 24047E3A

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVC
2nd Reviewer: [illegible]

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 #: 41047 E7A
SDG #: —

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: W

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 # 24097E39

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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

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	8/26/2010 10:34	HCB CLP1	50	50.1	50.1	0.3	0.3
			DDT CLP1	50	53.3	54.0	6.6	8.0
			HCB CLP2	50	52.0	52.8	3.9	5.6
			DDT CLP2	50	53.1	53.1	6.2	6.2
2	019F1901	8/26/2010 4:00 14:35	HCB CLP1	50	50.6	50.6	1.2	1.2
			DDT CLP1	50	54.2	54.9	8.4	9.7
			HCB CLP2	50	54.1	54.9	8.2	9.8
			DDT CLP2	50	58.5	58.5	17.0	17.0
3								
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope/CF	Area	Area			
HCB CLP2	7928	418461	435408			
DDT CLP1	5090	274821	279289			
DDT CLP2	5475	290810	320384			

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	364740	-4.270	7365.983	6214.816	50.130		-358525.1838	48134581.08	6937.90898	50.1297378	1675.06064
CCV2 HCB CLP1	367899	-4.270	7365.983	6214.816	50.585		-361684.1838	48080629.6	6934.01973	50.58519	1674.60519

LDC #: 24047F3a

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	CLP 1	20	16.5	82	82	0
Tetrachloro-m-xylene	2		17.0	85	85	
Decachlorobiphenyl	1		19.9	100	100	
Decachlorobiphenyl	2		20.7	104	104	

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 #: 24047E34

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: 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	.0	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	16.4	16.6	0	21.8	18.1	133	133	109	109	18	18
4,4'-DDT	↓	↓	13.5	31.5	32.7	100	110	113	113	2	2
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.

31.47 ✓
30.927 30.8
~~31.477~~
30.768 31.7

LDC #: 24047F31

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

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

LCS/LCSD samples: LCS 280 - 27469/2-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	12.9	NA	80	80				
4,4'-DDT	↓	↓	13.8	↓	85	85				
Aroclor 1260										

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

LDC #: 24047 E 3q

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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: $y = -4.270x^2 + 7365.983x + 6214.816$

~~Conc.~~ = $\left(\frac{737\,366 - 6214.816}{-4.270}\right)^{1/2}$

$X = 9.22$

final conc. $= \frac{(9.22)(10\text{ ml})}{(29.95)(0.95)}$

$= 3.241$

≈ 3.2 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 17, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6583-1

Sample Identification

BDT-4-N-15-16.0BPC
BDT-4-N-15-18.0BPC**
BDT-4-N-15-12.0BPC
BDT-4-N-15-14.0BPC
BDT-4-N-15-8.0BPC
BDT-4-N-15-10.0BPC
BDT-4-N-20-10.0BPC
BDT-4-N-20-12.0BPC
BDT-4-N-20-14.0BPC
BDT-4-N-20-16.0BPC
BDT-4-N-20-18.0BPC**
BDT-4-N-20-2.0BPC
BDT-4-N-20-4.0BPC
BDT-4-N-20-6.0BPC
BDT-4-N-20-8.0BPC
BDT-4-N-20-6.0BPC_FD
BDT-4-N-15-16.0BPCMS
BDT-4-N-15-16.0BPCMSD
BDT-4-N-15-18.0BPCMS
BDT-4-N-15-18.0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 20 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.

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. 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 280-6583-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-N-20-6.0BPC and BDT-4-N-20-6.0BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-20-6.0BPC	BDT-4-N-20-6.0BPC_FD				
4,4'-DDE	0.78	1.8U	-	1.02 (≤1.8)	-	-
Hexachlorobenzene	0.46	1.8U	-	1.34 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6583-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6583-1	BDT-4-N-15-16.0BPC BDT-4-N-15-18.0BPC** BDT-4-N-15-12.0BPC BDT-4-N-15-14.0BPC BDT-4-N-15-8.0BPC BDT-4-N-15-10.0BPC BDT-4-N-20-10.0BPC BDT-4-N-20-12.0BPC BDT-4-N-20-14.0BPC BDT-4-N-20-16.0BPC BDT-4-N-20-18.0BPC** BDT-4-N-20-2.0BPC BDT-4-N-20-4.0BPC BDT-4-N-20-6.0BPC BDT-4-N-20-8.0BPC BDT-4-N-20-6.0BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6583-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6583-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047G3a
SDG #: 280-6583-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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: 8/17/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%D ≤ 20% rr
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
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	
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 = 14 16
XV.	Field blanks	NB	~~FB = EB 04/13/2010: R1 G2 = R2E~~

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-4-N-15-16.0BPC	11	BDT-4-N-20-18.0BPC**	21	MB 280-28878/1-A	31	
2	BDT-4-N-15-18.0BPC**	12	BDT-4-N-20-2.0BPC	22		32	
3	BDT-4-N-15-12.0BPC	13	BDT-4-N-20-4.0BPC	23		33	
4	BDT-4-N-15-14.0BPC	14	BDT-4-N-20-6.0BPC D	24		34	
5	BDT-4-N-15-8.0BPC	15	BDT-4-N-20-8.0BPC	25		35	
6	BDT-4-N-15-10.0BPC	16	BDT-4-N-20-6.0BPC_FD D	26		36	
7	BDT-4-N-20-10.0BPC	17	BDT-4-N-15-16.0BPCMS	27		37	
8	BDT-4-N-20-12.0BPC	18	BDT-4-N-15-16.0BPCMSD	28		38	
9	BDT-4-N-20-14.0BPC	19	BDT-4-N-15-18.0BPCMS	29		39	
10	BDT-4-N-20-16.0BPC	20	BDT-4-N-15-18.0BPCMSD	30		40	

LDC #: 24047 63A

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: V

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 #: 24047G39

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: L

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.		✓		

LDC#: 24047G3a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: DVG
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)
	14	16				
4,4'-DDE	0.78	1.8U		1.02	≤1.8	
Hexachlorobenzene	0.46	1.8U		1.34	≤1.8	

V:\FIELD DUPLICATES\24047G3a.wpd

LDC # 24047 G3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV
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 # 24047 G3A

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVC
2nd Reviewer: [illegible]

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 # 34047 G3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: M

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 # 24647 G3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
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 # 34047 639

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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

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	043F4301	9/1/2010 23:53	HCB CLP1	50	51.7	52.4	3.4	4.7
			b-BHC CLP1	50	54.8	55.6	9.5	11.1
			HCB CLP2	50	49.0	49.0	2.1	2.0
			b-BHC CLP2	50	51.9	51.9	3.8	3.8
2	058F5801	9/2/2010 4:00	HCB CLP1	50	50.9	51.6	1.8	3.2
			b-BHC CLP1	50	53.7	54.5	7.4	9.0
			HCB CLP2	50	48.0	48.0	4.0	4.0
			b-BHC CLP2	50	50.5	50.5	1.0	1.0
3								
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area	Area		
HCB CLP1	9638	504640	497245			
b-BHC CLP1	4813	267482	262265			

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	882191	-29.504	19034.789	20708.902	48.976		-861482.098	260654521	16144.7986	48.9762477	596.183358
CCV1 b-BHC 2	467078	-13.537	9529.796	9066.025	51.885		-458011.9746	66016264.49	8125.03935	51.8851601	652.08737
CCV2 HCB CLP2	866679	-29.504	19034.789	20708.902	48.017		-845970.098	262485185.2	16201.3945	48.017124	597.142481
CCV2 b-BHC 2	455820	-13.537	9529.796	9066.025	50.503		-446753.9746	66625870.32	8162.46717	50.5027508	653.469779

LDC #: 24047 G39

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: # 2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	CLP 1	20	16.7	83	83	0
Tetrachloro-m-xylene	2		15.2	76	76	
Decachlorobiphenyl	1		21.1	105	105	
Decachlorobiphenyl	2		18.6	93	93	

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 #: 24047 G39

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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: 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
gamma-BHC	18.3	18.5	0	17.9	17.0	98	98	9 v	9 v	5	5
4,4'-DDT	1	1	1	14.6	14.v	80	80	77	77	3	3
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 #: 24041 G39

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 – 28878 /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	14.3	NA	88	88				
4,4'-DDT	↓	↓	12.9	↓	80	80				
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 #: 24047G3A

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

Example:

Sample I.D. # 2 B

Conc. = $\frac{(26328 - 3877)}{(4813)}$

= 4.665

final conc. = $\frac{(4.665)(10\ ml)}{(30.3g)(0.901)}$

= 1.70 ug/kg

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

Note: (Intercept values not provided in the summaries)

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 24, 2010

LDC Report Date: October 11, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6783-1

Sample Identification

EB-08242010
BDT-4-S-5-10BPC
BDT-4-S-5-12BPC
BDT-4-S-5-14BPC**
BDT-4-S-5-16BPC
BDT-4-S-5-18BPC
BDT-4-S-5-2BPC
BDT-4-S-5-4BPC
BDT-4-S-5-6BPC
BDT-4-S-5-8BPC
BDT-4-S-5-16BPC_FD
BDT-4-N-5-10BPC
BDT-4-N-5-12BPC
BDT-4-N-5-14BPC
BDT-4-N-5-16BPC
BDT-4-N-5-18BPC**
BDT-4-N-5-2BPC
BDT-4-N-5-4BPC
BDT-4-N-5-6BPC
BDT-4-N-5-8BPC
BDT-4-S-5-10BPCMS
BDT-4-S-5-10BPCMSD
BDT-4-N-5-2BPCMS
BDT-4-N-5-2BPCMSD
BDT-4-N-5-4BPCMS
BDT-4-N-5-4BPCMSD
BDT-4-N-5-6BPCMS
BDT-4-N-5-6BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 27 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.

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

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

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

V. Blanks

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

Sample EB-08242010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-4-S-5-2BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	153 (63-124) 151 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A
BDT-4-S-5-4BPC	CLP1	Decachlorobiphenyl	261 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A
BDT-4-N-5-2BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	202 (63-124) 206 (63-124)	All TCL compounds except 4,4'-DDE	J+ (all detects)	A
BDT-4-N-5-2BPC (2X)	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	198 (63-124) 206 (63-124)	4,4'-DDE	J+ (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS280-29004/5-A (EB-08242010)	Toxaphene	128 (63-118)	138 (63-118)	-	J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

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

XII. Project Quantitation Limit

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

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

Sample	Compound	RPD	Flag	A or P
BDT-4-S-5-14BPC**	4,4'-DDT	40.6 (≤40)	J (all detects)	A
BDT-4-N-5-18BPC**	beta-BHC	97.8 (≤40)	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6783-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-S-5-16BPC and BDT-4-S-5-16BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-5-16BPC	BDT-4-S-5-16BPC_FD				
4,4'-DDE	100	110	10 (≤50)	-	-	-
4,4'-DDT	24	16	40 (≤50)	-	-	-
beta-BHC	1.3	1.6	-	0.3 (≤1.8)	-	-
Hexachlorobenzene	2.5	2.6	-	0.1 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6783-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6783-1	BDT-4-S-5-2BPC BDT-4-S-5-4BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6783-1	BDT-4-N-5-2BPC	All TCL compounds except 4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6783-1	BDT-4-N-5-2BPC (2X)	4,4'-DDE	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6783-1	EB-08242010	Toxaphene	J+ (all detects)	P	Laboratory control samples (%R) (l)
280-6783-1	BDT-4-S-5-14BPC**	4,4'-DDT	J (all detects)	A	Compound quantitation and CRQLs (RPD) (dc)
280-6783-1	BDT-4-N-5-18BPC**	beta-BHC	J (all detects)	A	Compound quantitation and CRQLs (RPD) (dc)
280-6783-1	EB-08242010 BDT-4-S-5-10BPC BDT-4-S-5-12BPC BDT-4-S-5-14BPC** BDT-4-S-5-16BPC BDT-4-S-5-18BPC BDT-4-S-5-2BPC BDT-4-S-5-4BPC BDT-4-S-5-6BPC BDT-4-S-5-8BPC BDT-4-S-5-16BPC_FD BDT-4-N-5-10BPC BDT-4-N-5-12BPC BDT-4-N-5-14BPC BDT-4-N-5-16BPC BDT-4-N-5-18BPC** BDT-4-N-5-2BPC BDT-4-N-5-4BPC BDT-4-N-5-6BPC BDT-4-N-5-8BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6783-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-6783-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047K3a
SDG #: 280-6783-1
Laboratory: Test America

Date: 10/06/10
Page: 1 of 1
Reviewer: JN
2nd Reviewer:

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: 8/24/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20 %
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	SW	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 = 5, 11
XV.	Field blanks	ND	EB = 1 FB = FB-04132010-RIG2-RTE

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

water + soil

1	EB-08242010	W	11	BDT-4-S-5-16BPC_FD	D S	21	BDT-4-S-5-10BPCMS	S	31	MB 280-29748/1-A
2	BDT-4-S-5-10BPC	S	12	BDT-4-N-5-10BPC		22	BDT-4-S-5-10BPCMSD		32	MB 280-29894/1-A
3	BDT-4-S-5-12BPC		13	BDT-4-N-5-12BPC		23	BDT-4-N-5-2BPCMS		33	MB 280-29604/1-A
4	BDT-4-S-5-14BPC**		14	BDT-4-N-5-14BPC		24	BDT-4-N-5-2BPCMSD		34	
5	BDT-4-S-5-16BPC	D	15	BDT-4-N-5-16BPC		25	BDT-4-N-5-4BPCMS		35	
6	BDT-4-S-5-18BPC		16	BDT-4-N-5-18BPC**		26	BDT-4-N-5-4BPCMSD		36	
7	BDT-4-S-5-2BPC		17	BDT-4-N-5-2BPC		27	BDT-4-N-5-6BPCMS		37	
8	BDT-4-S-5-4BPC		18	BDT-4-N-5-4BPC		28	BDT-4-N-5-6BPCMSD		38	
9	BDT-4-S-5-6BPC		19	BDT-4-N-5-6BPC		29			39	
10	BDT-4-S-5-8BPC		20	BDT-4-N-5-8BPC		30			40	

LDC #: 24047 K3c

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 #: 24047K39

VALIDATION FINDINGS CHECKLIST

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. Aroclor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
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 #: 29067 K39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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 (25x)	CLP 1	A	52 (59-115)	No qual (J only)
			2	↓	49 (↓)	↓
			1	B	0 (63-124)	
			2	↓	23 (↓)	↓
					( )	
		7	1	B	153 ( )	J+ dets /A (S) *
			2	↓	151 ( )	↓
					( )	
		7 (10x)	1	B	140 ( )	No qual
			2	↓	136 ( )	↓
					( )	
		8	1	B	261 (↓)	J+ dets /A (S) *
					( )	
		8 (25x)	1	A	42 (59-115)	No qual
			2	↓	35 (↓)	↓
			1	B	~~54~~ (63-124)	
			2	↓	29 (↓)	↓
					( )	
		10 (20x)	1	A	57 (59-115)	
			2	↓	52 (↓)	
			1	B	31 (63-124)	
			2	↓	61 (↓)	

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

* All except J, 0

LDC #: 29047 K3A

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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
		17	CLP 1	B	20% (63-124)	J+ dets / A (S) **
			2		206 ( )	
					( )	
		17 (2.0X)	1	B	178 ( )	(S) (J only)
			2		206 ( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

** All except J

LDC #: 24047 K3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		21/22	J	-5656 (61-115)	-5629 (61-115)	( )	2	No qual (LCS in)
			O	-62 (53-125)	-60 (53-125)	( )		
			~~H~~	( )	( )	( )		
				( )	( )	( )		
		23/24	U	623 (54-135)	676 (54-135)	( )	17	No qual (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		

LDC #: 29047K3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples

Page: 1 of 1
Reviewer: JYC
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 laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

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

Level IV/D Only

[✓ Y] N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS 280-29004/5-A	U	128 (63-118)	138 (63-118)	( )	All W	J+dets/P (A)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
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				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 24047 K3a
SDG #: Sw Comm

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: LA

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
	0	4	40.6	J dets (A) (dc)
	B	16	97.8	

Comments: See sample calculation verification worksheet for recalculations

LDC#: 24047K3a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JW
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)
	5	11				
4,4'-DDE	100	110	10			
4,4'-DDT	24	16	40			
beta-BHC	1.3	1.6		0.3	≤1.8	
Hexachlorobenzene	2.5	2.6		0.1	≤1.8	

V:\FIELD DUPLICATES\24047K3a.wpd

LDC #24647 K3C

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: DG
2nd Reviewer: [illegible]

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 # 24047 R34

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JNC
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	4,4'-DDT	33015.00	4.00		8253.75
			78046.00	10.00		7804.60
	GCS_P2		193282.00	25.00		7731.28
			386784.00	50.00		7735.68
			581766.00	75.00		7756.88
			756268.00	100.00		7562.68

Ave RF 7807.48

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		5851.33656		
R Squared		0.99959	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	7650.960458	-1.270906	b =	7636.000000
Std Err of Coef.	42.600546	0.79		

LDC #24647 K39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV
2nd Reviewer: [illegible]

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 # 24647 K3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	4,4'-DDT	59795.00	4.00	16.00	14949
			137046.00	10.00	100.00	13705
	GCS_P2		321682.00	25.00	625.00	12867
			607290.00	50.00	2500.00	12146
			883436.00	75.00	5625.00	11779
			1123921.00	100.00	10000.00	11239

Ave RF 12781

Regression Output:			Reported	
Constant		8705.27176	c =	NR
Std Err of Y Est		3439.22112		
R Squared		0.99996	r2 =	0.999990
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	12932.023828	-17.656945	b =	NR
Std Err of Coef.	164.371396	1.57		

LDC # 26047 K34

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JTG
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	045F4501	9/8/2010 1:07	HCB CLP1	50	52.0	52.6	3.9	5.3
			4,4'-DDT CLP1	50	52.8	53.1	5.6	6.2
			HCB CLP2	50	50.6	50.6	1.3	1.2
			4,4'-DDT CLP2	50	52.3	52.3	4.6	4.5
2	058F5801	9/8/2010 4:42	HCB CLP1	50	52.8	53.5	5.7	7.0
			4,4'-DDT CLP1	50	52.5	52.8	4.9	5.6
			HCB CLP2	50	51.8	51.8	3.6	3.6
			4,4'-DDT CLP2	50	53.0	52.9	5.9	5.9
3	018F1801	9/8/2010 18:06	HCB CLP1	50	51.0	51.7	2.0	3.4
			4,4'-DDT CLP1	50	50.8	51.1	1.7	2.3
			HCB CLP2	50	50.1	50.1	0.2	0.2
			4,4'-DDT CLP2	50	51.9	51.9	3.8	3.7
4								

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area	Area		
HCB CLP1	9638	507356	515626	498100		
DDT CLP1	7636	405496	403020	390491		

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	908726	-29.504	19034.789	20708.902	50.625		-888017.098	257522966.4	16047.5221	50.6247775	594.534828
CCV1 ddt CLP2	636259	-17.657	12932.024	8705.272	52.255		-627553.728	122914380	11086.6758	52.2554288	680.146678
CCV2 HCB CLP2	927282	-29.504	19034.789	20708.902	51.784		-906573.098	255333061.5	15979.1446	51.7835619	593.376044
CCV2 ddt CLP2	643753	-17.657	12932.024	8705.272	52.932		-635047.728	122385093.8	11062.7797	52.9321046	679.470002
CCV3 HCB CLP2	900364	-29.504	19034.789	20708.902	50.104		-879655.098	258509816.2	16078.2405	50.1041984	595.055407
CCV3 ddt CLP2	631851	-17.657	12932.024	8705.272	51.858		-623145.728	123225708.3	11100.7076	51.8580858	680.544021
Sample #4 ddt	296858	-17.657	12932.024	8705.272	23.005	**8.08**	-288152.728	146885593.9	12119.6367	23.0046807	709.397426

LDC #: 24067 K34

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: # 4

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	CLP 1	20	17.7	89	89	0
Tetrachloro-m-xylene	2		16.9	85	85	
Decachlorobiphenyl	1		20.4	102	102	
Decachlorobiphenyl	2		21.6	108	108	

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 #: 24047 K3C

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: 21/27

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	17.7	17.8	0	16.7	17.0	94	94	96	96	Y	Y
4,4'-DDT	↓	↓	33	21.7	22.0	-67	0	-60	0	1	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.

LDC #: 24067 K34

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 280-29748/2-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	16.3	NA	13.95	NA	86	86				
4,4'-DDT	↓	↓	13.9 ✓	↓	85	85				
Aroclor 1260										

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

LDC #: 29047 (13c
SDG #: Sw Conv

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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 0 :
$y = ax^2 + bx + c$

296.858 = $(-17.657)x^2 + 12932.024x + 870527$

$x = 23.005$

final conc. = $\frac{(23.005)(10ml)}{(31.2g)(0.913)}$

= 8.08 ug/kg

≈ 8 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 25, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6818-1

Sample Identification

SSAJ3-02-1BPC

Introduction

This data review covers one soil 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.

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/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 .

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.

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.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAJ3-02-1BPC	CLP1	Decachlorobiphenyl Decachlorobiphenyl	542 (63-124) 565 (63-124)	All TCL compounds except Hexachlorobenzene beta-BHC	J+ (all detects)	A

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. 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

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 280-6818-1	All compounds 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 Chlorinated Pesticides - Data Qualification Summary - SDG 280-6818-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6818-1	SSAJ3-02-1BPC	All TCL compounds except Hexachlorobenzene beta-BHC	J+ (all detects)	A	Surrogate spikes (%R) (s)
280-6818-1	SSAJ3-02-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6818-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6818-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24047L3a
SDG #: 280-6818-1
Laboratory: Test America

Date: 10/6/10
Page: 1 of 1
Reviewer: JM
2nd Reviewer: [illegible]

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: 8/25/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
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	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = ~~FB-04072010-R2D (from 280-2216-2)~~

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: Soil

+ 1	SSAJ3-02-1BPC	11		21		31	
- 2	MB 280-29894/1-A	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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 #: 24047L31

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVG
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
		1		B	54% (63-124)	J+ dets /A (5) *
				B	565 ( )	
					( )	
		1 (5x)		B	576 ( )	No spike
				B	565 ( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

* All except FF, B

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 26, 2010

LDC Report Date: October 11, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6851-1

Sample Identification

SSAJ3-02-5BPC

Introduction

This data review covers one soil 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.

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/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 .

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.

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
SSAJ3-02-5BPC	CLP2	Decachlorobiphenyl	137 (63-124)	All TCL compounds	J+ (all detects)	P

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. 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

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 280-6851-1	All compounds 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
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6851-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6851-1	SSAJ3-02-5BPC	All TCL compounds	J+ (all detects)	P	Surrogate spikes (%R) (s)
280-6851-1	SSAJ3-02-5BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6851-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-6851-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24047M3a
SDG #: 280-6851-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 1
Reviewer: JM
2nd Reviewer:

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: 8/26/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% r
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
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	N	
XII.	Compound quantitation and reported CRQLs	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	SSAJ3-02-5BPC	11		21		31	
2	MB 280-29894/1-A	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Primary col. =

LDC #: 24047 M39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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	clp2	B	137 (63-124)	J+ dets/p (J)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
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					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

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 8, 2010

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6886-1

Sample Identification

BDT-1-N-20-10BPC	BDT-1-N-10-4BPC	BDT-1-N-20-10BPCMS
BDT-1-N-20-12BPC**	BDT-1-N-10-6BPC	BDT-1-N-20-10BPCMSD
BDT-1-N-20-14BPC	BDT-1-N-10-8BPC	BDT-1-N-15-4BPCMS
BDT-1-N-20-2BPC	BDT-1-N-10-8BPC_FD	BDT-1-N-15-4BPCMSD
BDT-1-N-20-4BPC	BDT-1-N-15-10BPC	BDT-1-S-20-4BPCMS
BDT-1-N-20-6BPC	BDT-1-N-15-12BPC	BDT-1-S-20-4BPCMSD
BDT-1-N-20-8BPC	BDT-1-N-15-14BPC**	
BDT-1-N-20-10BPC_FD	BDT-1-N-15-8BPC	
BDT-1-N-5-10BPC	BDT-1-N-15-2BPC	
BDT-1-N-5-12BPC	BDT-1-N-15-4BPC	
BDT-1-N-5-14BPC	BDT-1-N-15-6BPC	
BDT-1-N-5-8BPC_FD	BDT-1-S-20-10BPC	
BDT-1-N-5-8BPC	BDT-1-S-20-12BPC	
BDT-1-N-5-2BPC	BDT-1-S-20-14BPC**	
BDT-1-N-5-4BPC	BDT-1-S-20-2BPC	
BDT-1-N-5-6BPC	BDT-1-S-20-4BPC	
BDT-1-N-10-10BPC	BDT-1-S-20-6BPC	
BDT-1-N-10-12BPC	BDT-1-S-20-8BPC	
BDT-1-N-10-14BPC	BDT-1-S-20-14BPC_FD	
BDT-1-N-10-2BPC	EB-08272010	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 45 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
9/9/10	041F4101.D	CLP2	4,4'-DDD	22.9	BDT-1-S-20-2BPC BDT-1-S-20-4BPC BDT-1-S-20-6BPC BDT-1-S-20-8BPC BDT-1-S-20-14BPC_FD BDT-1-S-20-4BPCMS BDT-1-S-20-4BPCMSD MB 280-30428/1-A	J+ (all detects)	A

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

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

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

V. Blanks

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

Sample EB-08272010 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-1-N-20-10BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	163 (63-124) 160 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-20-10BPC (2X)	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	156 (63-124) 152 (63-124)	Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-20-12BPC**	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	137 (63-124) 135 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-20-12BPC** (2X)	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	137 (63-124) 137 (63-124)	Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-20-14BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	416 (63-124) 398 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-20-2BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	248 (63-124) 250 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-5-10BPC	CLP1	Tetrachloro-m-xylene	123 (59-115)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-5-14BPC	CLP1	Tetrachloro-m-xylene	127 (59-115)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-5-8BPC (2X)	CLP1	Decachlorobiphenyl	126 (63-124)	Hexachlorobenzene	J+ (all detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-1-N-5-2BPC	CLP1	Decachlorobiphenyl	132 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-5-6BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	135 (63-124) 135 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-5-6BPC (2X)	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	138 (63-124) 137 (63-124)	Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-10BPC	CLP1 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	116 (59-115) 541 (63-124) 582 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-12BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	383 (63-124) 392 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-14BPC	CLP1 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	120 (59-115) 433 (63-124) 474 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-2BPC	CLP2 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	146 (59-115) 1681 (63-124) 2102 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-4BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	121 (59-115) 116 (59-115) 1314 (63-124) 1488 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-6BPC	CLP2 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	168 (59-115) 2942 (63-124) 4283 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-8BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	231 (63-124) 474 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-10-8BPC_FD	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	219 (63-124) 222 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-10BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	544 (63-124) 590 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-12BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	390 (63-124) 416 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-14BPC**	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	321 (63-124) 341 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
BDT-1-N-15-8BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	276 (63-124) 301 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-2BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	117 (59-115) 182 (59-115) 3325 (63-124) 4896 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-4BPC	CLP1 CLP1 CLP2	Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	189 (59-115) 4523 (63-124) 7532 (63-124)	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A
BDT-1-N-15-6BPC	CLP1 CLP2 CLP1 CLP2	Tetrachloro-m-xylene Tetrachloro-m-xylene Decachlorobiphenyl Decachlorobiphenyl	125 (59-115) 125 (59-115) 1789 (63-124) 2991 (63-124)	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A
BDT-1-S-20-10BPC	CLP1 CLP2	Decachlorobiphenyl Decachlorobiphenyl	130 (63-124) 208 (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) and relative percent difference (RPD) were not within QC limits for some 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. 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 280-6886-1	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-N-20-10BPC and BDT-1-N-20-10BPC_FD, samples BDT-1-N-5-8BPC_FD and BDT-1-N-5-8BPC, samples BDT-1-N-10-8BPC and BDT-1-N-10-8BPC_FD, and samples BDT-1-S-20-14BPC** and BDT-1-S-20-14BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-20-10BPC	BDT-1-N-20-10BPC_FD				
4,4'-DDE	0.53	1.8U	-	1.27 (≤1.8)	-	-
Hexachlorobenzene	46	3.6	-	42.4 (≤1.8)	J (all detects)	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-5-8BPC	BDT-1-N-5-8BPC_FD				
4,4'-DDE	39	51	27 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-5-8BPC	BDT-1-N-5-8BPC_FD				
4,4'-DDT	3.1	2.5	-	0.6 (≤1.8)	-	-
beta-BHC	9.7	3.3	-	6.4 (≤1.8)	J (all detects)	A
Endrin ketone	4.8	5.6	-	0.8 (≤1.8)	-	-
Hexachlorobenzene	13	4.5	-	8.5 (≤1.8)	J (all detects)	A
Methoxychlor	1.2	1.9	-	0.7 (≤3.4)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-10-8BPC	BDT-1-N-10-8BPC_FD				
4,4'-DDE	1.2	0.98	-	0.22 (≤1.8)	-	-
4,4'-DDT	1.1	0.98	-	0.12 (≤1.8)	-	-
Hexachlorobenzene	210	180	15 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-S-20-14BPC**	BDT-1-S-20-14BPC_FD				
4,4'-DDD	1.8U	0.70	-	1.1 (≤1.8)	-	-
4,4'-DDE	22	27	20 (≤50)		-	-
4,4'-DDT	10	14	33 (≤50)		-	-
beta-BHC	24	25	4 (≤50)		-	-
Endrin ketone	1.8U	0.78	-	1.02 (≤1.8)	-	-
Hexachlorobenzene	4.2	4.5	-	0.3 (≤1.8)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-6886-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6886-1	BDT-1-S-20-2BPC BDT-1-S-20-4BPC BDT-1-S-20-6BPC BDT-1-S-20-8BPC BDT-1-S-20-14BPC_FD	4,4'-DDD	J+ (all detects)	A	Continuing calibration (%D) (c)
280-6886-1	BDT-1-N-20-10BPC BDT-1-N-20-12BPC** BDT-1-N-5-6BPC BDT-1-S-20-10BPC	All TCL compounds	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6886-1	BDT-1-N-5-8BPC	Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6886-1	BDT-1-N-20-14BPC BDT-1-N-20-2BPC BDT-1-N-5-10BPC BDT-1-N-5-14BPC BDT-1-N-5-2BPC BDT-1-N-10-10BPC BDT-1-N-10-12BPC BDT-1-N-10-14BPC BDT-1-N-10-2BPC BDT-1-N-10-4BPC BDT-1-N-10-6BPC BDT-1-N-10-8BPC BDT-1-N-10-8BPC_FD BDT-1-N-15-10BPC BDT-1-N-15-12BPC BDT-1-N-15-14BPC** BDT-1-N-15-8BPC BDT-1-N-15-2BPC BDT-1-N-15-6BPC	All TCL compounds except Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)
280-6886-1	BDT-1-N-15-4BPC	All TCL compounds except 4,4'-DDE 4,4'-DDT Hexachlorobenzene	J+ (all detects)	A	Surrogate recovery (%R) (s)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-6886-1	BDT-1-N-20-10BPC BDT-1-N-20-12BPC** BDT-1-N-20-14BPC BDT-1-N-20-2BPC BDT-1-N-20-4BPC BDT-1-N-20-6BPC BDT-1-N-20-8BPC BDT-1-N-20-10BPC_FD BDT-1-N-5-10BPC BDT-1-N-5-12BPC BDT-1-N-5-14BPC BDT-1-N-5-8BPC_FD BDT-1-N-5-8BPC BDT-1-N-5-2BPC BDT-1-N-5-4BPC BDT-1-N-5-6BPC BDT-1-N-10-10BPC BDT-1-N-10-12BPC BDT-1-N-10-14BPC BDT-1-N-10-2BPC BDT-1-N-10-4BPC BDT-1-N-10-6BPC BDT-1-N-10-8BPC BDT-1-N-10-8BPC_FD BDT-1-N-15-10BPC BDT-1-N-15-12BPC BDT-1-N-15-14BPC** BDT-1-N-15-8BPC BDT-1-N-15-2BPC BDT-1-N-15-4BPC BDT-1-N-15-6BPC BDT-1-S-20-10BPC BDT-1-S-20-12BPC BDT-1-S-20-14BPC** BDT-1-S-20-2BPC BDT-1-S-20-4BPC BDT-1-S-20-6BPC BDT-1-S-20-8BPC BDT-1-S-20-14BPC_FD EB-08272010	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-6886-1	BDT-1-N-20-10BPC BDT-1-N-20-10BPC_FD	Hexachlorobenzene	J (all detects)	A	Field duplicates (Difference) (fd)
280-6886-1	BDT-1-N-5-8BPC BDT-1-N-5-8BPC_FD	beta-BHC Hexachlorobenzene	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-6886-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-6886-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N3a
SDG #: 280-6886-1
Laboratory: Test America

Date: 10/05/10
Page: 1 of 2
Reviewer: SVG
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: 8/27/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20% r
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 20%
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	
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_1 = 1, 8 D_2 = 12, 13 D_3 = 23, 24 D_4 = 34, 39
XV.	Field blanks	ND	EB = 40 ~~FB = FB-04132010-RTG2-RZE~~ (from 280-2400-2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil + water

1	BDT-1-N-20-10BPC	D_1 S	11	BDT-1-N-5-14BPC	S	21	BDT-1-N-10-4BPC	S	31	BDT-1-N-15-6BPC	S
2	BDT-1-N-20-12BPC**		12	BDT-1-N-5-8BPC_FD	D_2	22	BDT-1-N-10-6BPC		32	BDT-1-S-20-10BPC	
3	BDT-1-N-20-14BPC		13	BDT-1-N-5-8BPC	D_2	23	BDT-1-N-10-8BPC	D_3	33	BDT-1-S-20-12BPC	
4	BDT-1-N-20-2BPC		14	BDT-1-N-5-2BPC		24	BDT-1-N-10-8BPC_FD	D_3	34	BDT-1-S-20-14BPC**	D_4
5	BDT-1-N-20-4BPC		15	BDT-1-N-5-4BPC		25	BDT-1-N-15-10BPC		35	BDT-1-S-20-2BPC	
6	BDT-1-N-20-6BPC		16	BDT-1-N-5-6BPC		26	BDT-1-N-15-12BPC		36	BDT-1-S-20-4BPC	
7	BDT-1-N-20-8BPC		17	BDT-1-N-10-10BPC		27	BDT-1-N-15-14BPC**		37	BDT-1-S-20-6BPC	
8	BDT-1-N-20-10BPC_FD	D_1	18	BDT-1-N-10-12BPC		28	BDT-1-N-15-8BPC		38	BDT-1-S-20-8BPC	
9	BDT-1-N-5-10BPC		19	BDT-1-N-10-14BPC		29	BDT-1-N-15-2BPC		39	BDT-1-S-20-14BPC_FD	D_4
10	BDT-1-N-5-12BPC		20	BDT-1-N-10-2BPC		30	BDT-1-N-15-4BPC		40	EB-08272010	W

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N3a
SDG #: 280-6886-1
Laboratory: Test America

Date: 10/05/10
Page: 2 of 2
Reviewer: JVL
2nd Reviewer:

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		Sampling dates:
II.	GC/ECD Instrument Performance Check	-	
III.	Initial calibration		1
IV.	Continuing calibration/ICV		page
V.	Blanks		see
VI.	Surrogate spikes		
VII.	Matrix spike/Matrix spike duplicates		
VIII.	Laboratory control samples		
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification		Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs		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

41	BDT-1-N-20-10BPCMS	51	MB 280-30108/1-A	61		71	
42	BDT-1-N-20-10BPCMSD	52	MB 280-30128/1-A	62		72	
43	BDT-1-N-15-4BPCMS	53	MB 280-30010/1-A	63		73	
44	BDT-1-N-15-4BPCMSD	54		64		74	
45	BDT-1-S-20-4BPCMS	55		65		75	
46	BDT-1-S-20-4BPCMSD	56		66		76	
47		57		67		77	
48		58		68		78	
49		59		69		79	
50		60		70		80	

LDC #: 24047 N39

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: V

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?	✓		NA	
VII. Matrix spike/Matrix spike duplicates				

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 #: 24047 N3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 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
	9/09/10	041F4101	clp 2	M (+)	22.9	( )	35, 36-39, 45, 46,	J + dets A
						( )	MB 280-30428/1-A	
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

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 #: 24047N3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 7
Reviewer: JVG
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
		1	CLP 1	B	163 (63-124)	J+ dets /A (S) (All except FF)
			2		160 ( )	
					( )	
		1 (2x)	1		156 ( )	(FF only)
			2		152 ( )	
					( )	
		2	1		137 ( )	(All except FF)
			2		135 ( )	
					( )	
		2 (2x)	1		137 ( )	(FF only)
			2		137 ( )	
					( )	
		3	1		416 ( )	(All except FF)
			✓		398 ( )	
					( )	
		3 (20x)	1		371 ( )	No qual (FF only)
			2		418 ( )	
					( )	
		4	1		248 ( )	J+ dets /A (S) (All except FF)
			✓	✓	250 (✓)	

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

LDC #: 34047 N39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JV6
2nd Reviewer: [illegible]

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
		4 (10x)	CLP 2	B	250 (63-124)	No qual (FF only)
			2		( )	
		9	CLP 1	A	123 (59-115)	J+ dets (S) All except FF
					( )	
		11	CLP 1	A	127 ( )	*
					( )	
		13 (2x)	CLP 1	B	126 (63-124)	(FF only)
					( )	
		14	CLP 1	B	132 ( )	*
					( )	
		16	CLP 1	B	135 ( )	*
			2		135 ( )	
					( )	
		16 (2x)	CLP 1	B	138 ( )	(FF only)
			2	B	137 ( )	
					( )	
		17	CLP 1	A	116 (59-115)	*
			CLP 1	B	54) ( )	
			2		58 ( )	
					( )	

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

* All except FF

LDC #: 24047 N3a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JVG
2nd Reviewer: [illegible]

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
		18	CLP 1	B	383 (63-124)	J+ dets /A * (S)
			2		392 ( )	
					( )	
		18 (20x)	1		373 ( )	No qual (FF only)
			2		407 ( )	
					( )	
		19	1	A	120 (59-115)	J+ dets /A * (S)
			1	B	433 (63-124)	
			2		474 ( )	
					( )	
		19 (20x)	1	B	447 ( )	No qual (FF only)
			2		463 ( )	
					( )	
		20	2	A	146 (59-115)	J+ dets /A * (S)
			1	B	1681 (63-124)	
			2		2107 ( )	
					( )	
		20 (100x)	1	A	D (59-115)	No qual (FF only)
			2	A	0 ( )	
			1	B	1677 (63-124)	
			2	B	1803	

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

* All except FF

LDC #: 24067 N8a

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JVG
2nd Reviewer: [illegible]

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
		21	clp 1	A	121 (59-115)	J+ dets /A * (5)
			2	↓	116 (↓)	↓
			1	B	1314 (63-124)	↓
			2	↓	1488 (↓)	↓
					( )	
		21 (100X)	1	A	0 (59-115)	No qual (FF only)
			2	↓	↓ (↓)	↓
			1	B	1263 (63-124)	↓
			2	↓	1307 (↓)	↓
					( )	
		22	2	A	168 (59-115)	J+ dets /A * (5)
			1	B	3947 (63-124)	↓
			2	↓	4283 (↓)	↓
					( )	
		22 (200X)	1	A	0 (59-115)	No qual
			2	↓	↓ (↓)	↓
			1	B	3149 (63-124)	↓
			2	↓	3145 (↓)	↓
					( )	
		23	1	B	231 ( )	J+ dets /A * (5)
			2	↓	474 ↓	↓

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

* All except FF

LDC #: 24047N39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 5 of 7
Reviewer: JV6
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
		23 (10x)	CLP 1	B	249 (63-124)	No qual (FF only)
			2	↓	262 ( )	
		24	1	B	219 ( )	J+ dets/A * (S)
			2	↓	227 ( )	↓
		24 (10x)	1	B	235 ( )	No qual (FF only)
			2	↓	243 ( )	↓
		25	1	B	544 ( )	J+ dets/A * (S)
			2	↓	590 ( )	↓
		25 (25x)	1	B	605 ( )	No qual (FF only)
			2	↓	604 ( )	↓
		26	1	B	390 ( )	J+ dets/A *
			2	↓	416 ( )	↓
		26 (20x)	1	B	416 ( )	No qual (FF only)
			2	↓	408 ( )	

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

* All except FF

LDC #: 24047N39

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JV6
2nd Reviewer: 1

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
		27	CLP 1	B	321 (63-124)	J+ acts/A * (5)
			2	↓	341 ( )	↓
					( )	
		27 (10x)	1	B	368 ( )	No qual **
			2	↓	360 ( )	
					( )	
		28	1	B	276 ( )	J+ acts/A * (5)
			2	↓	301 ( )	↓
					( )	
		28 (10x)	1	B	318 ( )	No qual **
			2	↓	328 ( )	↓
					( )	
		29	1	A	117 ( )	J+ acts/A *
			2	A	182 ( )	↓
			1	B	3325 ( )	↓
			2	↓	4896 (✓)	↓
					( )	
		29 (200x)	1	A	0 (59-115)	No qual **
			2	↓	↓ ( )	↓
			1	B	3597 (63-124)	↓
			2	↓	3764 ↓	↓

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

* All except FF

** FF only

LDC #: 24047 N34

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JV6
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
		30 ~~(200X~~	CLP1	A	189 (59-115)	J+ dets/A (5) (all except J, O, FF)
			1	B	4523 (63-124)	
			2	↓	7537 (↓)	
					( )	
		30 (200X)	1	A	D (59-115)	No qual (J, O, FF only)
			2	↓	↓ (↓)	
			1	B	5290 (63-124)	
			2	↓	5315 (↓)	
					( )	
		31	1	A	125 (59-115)	J+ dets/A * (5)
			2	↓	125 (↓)	
			1	B	1789 (63-124)	
			2	↓	2991 (↓)	
					( )	
		31 (100X)	1	A	0 (59-115)	No qual **
			2	↓	↓ (↓)	
			1	B	2075 (63-124)	
			2	↓	2133 (↓)	
					( )	
		32	1	B	130 (↓)	J+ dets/A (all TCL) *(5)
			2	↓	208 (↓)	

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

* All except FF

** FF only

LDC #: 24047N3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: VV
2nd Reviewer: [signature]

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
		41/47	FF	-141 (50-130)	-139 (50-130)	( )	1	No qual (LCS in)
			U	( )	( )	69 (23)	↓	↓ CMS, MSD in)
				( )	( )	( )		
		43/44	Several compounds	outside limits		( )	30	No qual (LCS in)
			for %R and %RPD					
				( )	( )	( )		
		45/46	B	134 (58-115)	124 (58-115)	( )	36	No qual (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 24047N3a

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	8				
4,4'-DDE	0.53	1.8U		1.27	≤1.8	
Hexachlorobenzene	46	3.6		42.4	≤1.8	Jdet/A (fd)

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	13	12				
4,4'-DDE	39	51	27			
4,4'-DDT	3.1	2.5		0.6	≤1.8	
beta-BHC	9.7	3.3		6.4	≤1.8	Jdet/A (fd)
Endrin ketone	4.8	5.6		0.8	≤1.8	
Hexachlorobenzene	13	4.5		8.5	≤1.8	Jdet/A (fd)
Methoxychlor	1.2	1.9		0.7	≤3.4	

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	23	24				
4,4'-DDE	1.2	0.98		0.22	≤1.8	
4,4'-DDT	1.1	0.98		0.12	≤1.8	
Hexachlorobenzene	210	180	15			

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	34	39				
4,4'-DDD	1.8U	0.70		1.1	≤1.8	
4,4'-DDE	22	27	20			
4,4'-DDT	10	14	33			
beta-BHC	24	25	4			
Endrin ketone	1.8U	0.78		1.02	≤1.8	
Hexachlorobenzene	4.2	4.5		0.3	≤1.8	

LDC #24047N3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV6
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	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 # 24047 (N32)

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP1	4,4'-DDT	33015.00	4.00		8253.75
			78046.00	10.00		7804.60
	GCS_P2		193282.00	25.00		7731.28
			386784.00	50.00		7735.68
			581766.00	75.00		7756.88
			756268.00	100.00		7562.68

Ave RF 7807.48

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		5851.33656		
R Squared		0.99959	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	7650.960458	-1.270906	b =	7636.000000
Std Err of Coef.	42.600546	0.79		

LDC # 24647 N3K

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV
2nd Reviewer: W

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 # 24047 N39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: W

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	Y Area	X Conc	X^2	
08/11/2010	CLP2	4,4'-DDT	59795.00	4.00	16.00	14949
			137046.00	10.00	100.00	13705
	GCS_P2		321682.00	25.00	625.00	12867
			607290.00	50.00	2500.00	12146
			883436.00	75.00	5625.00	11779
			1123921.00	100.00	10000.00	11239

Ave RF 12781

Regression Output:			Reported	
Constant		8705.27176	c =	NR
Std Err of Y Est		3439.22112		
R Squared		0.99996	r2 =	0.999990
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	12932.023828	-17.656945	b =	NR
Std Err of Coef.	164.371396	1.57		

LDC # 25047 N34

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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

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	9/7/2010 14:06	HCB CLP1	50	51.0	51.7	2.1	3.4
			4,4'-DDT CLP1	50	52.5	52.8	4.9	5.5
			HCB CLP2	50	48.6	48.6	2.8	2.8
			4,4'-DDT CLP2	50	46.6	46.7	6.7	6.7
2	015F1501	9/9/2010 15:50	HCB CLP1	50	51.6	52.3	3.2	4.6
			4,4'-DDT CLP1	50	53.6	53.9	7.2	7.8
			HCB CLP2	50	49.5	49.6	0.9	0.9
			4,4'-DDT CLP2	50	53.6	53.6	7.2	7.1
3	028F2801	9/9/2010 19:25	HCB CLP1	50	52.7	53.3	5.3	6.7
			4,4'-DDT CLP1	50	53.0	53.3	5.9	6.6
			HCB CLP2	50	50.8	50.7	1.5	1.5
			4,4'-DDT CLP2	50	54.3	54.3	8.6	8.6
4	005F0501	9/8/2010 14:31	HCB CLP1	50	50.7	51.4	1.4	2.7
			HCB CLP2	50	49.7	49.7	0.7	0.7
5	005F0501	9/10/2010 11:56	HCB CLP1	50	50.7	51.4	1.4	2.7
			HCB CLP2	50	48.2	48.2	3.7	3.6

		CCV1	CCV2	CCV3	CCV4	CCV5
	Slope	Area	Area	Area	Area	Area
HCB CLP1	9638	498434	503972	513994	495072	494984
DDT CLP1	7636	402900	411700	406809		

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	876250	-29.504	19034.789	20708.902	48.609		-855541.098	261355654.1	16166.4979	48.6085126	596.551093
CCV1 ddt CLP2	573723	-17.657	12932.024	8705.272	46.665		-565017.728	127331172.6	11284.1115	46.6645661	685.737541
CCV2 HCB CLP2	891452	-29.504	19034.789	20708.902	49.550		-870743.098	259561574.8	16110.9148	49.5504716	595.609134
CCV2 ddt CLP2	650630	-17.657	12932.024	8705.272	53.554		-641924.728	121899385	11040.8055	53.5543565	678.84775
CCV3 HCB CLP2	910654	-29.504	19034.789	20708.902	50.745		-889945.098	257295431.6	16040.4312	50.7449472	594.414658
CCV3 ddt CLP2	658901	-17.657	12932.024	8705.272	54.304		-650195.728	121315220.9	11014.3189	54.3043863	678.09772
CCV4 HCB CLP2	893219	-29.504	19034.789	20708.902	49.660		-872510.098	259353040.5	16104.4416	49.6601708	595.499435
CCV5 HCB CLP2	869462	-29.504	19034.789	20708.902	48.189		-848753.098	262156746.7	16191.2553	48.1889531	596.970652

LDC #: 24647 N39

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

Page: 1 of 1
Reviewer: JYG
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: # 2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	CLP 1	20	16.2	81	81	0
Tetrachloro-m-xylene	CLP 2		14.6	73	73	
Decachlorobiphenyl	1		27.4	137	137	
Decachlorobiphenyl	2		27.0	135	135	

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 #: 24047N3a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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: 41/42

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	0	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	17.7	17.7		17.84	16.78	97	97	95	95	2	2
4,4'-DDT	↓	↓		17.08	16.74	96	96	96	96	0.8	0.8
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 #: 4047 N3A

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

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

LCS/LCSD samples: LCS 280-30428/2-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	16.5	NA	16.0	NA	97	97				
4,4'-DDT	↓	↓	16.6	↓	101	107				
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 #: 24047 N3A

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. #7 FF: (2x)

Conc. = $\frac{(52.4243)(10ml)(2)}{(.9638)(30.1g)(0.923)}$

= 39.199

≈ 39 ug/kg

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

Note:

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Data Validation Reports
LDC #24047

Metals

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: April 8, 2010

LDC Report Date: October 15, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-10

Sample Identification

SSAO6-05-6BPC

Introduction

This data review covers one soil 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.

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 sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2280-10	All analytes reported below the PQL.	J (all detects)	A

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 280-2280-10

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-10	SSAO6-05-6BPC	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 280-2280-10

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2280-10

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Field Blank Data Qualification Summary - SDG 280-2280-10

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 24047A4
SDG #: 280-2280-10
Laboratory: Test America

Date: 10-5-10
Page: 1 of 1
Reviewer: MG
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: 4-8-10
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	A	
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	SSAO6-05-6BPC	11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10	PBS	20		30		40	

Notes:

LDC #: 24047A4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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?	✓			

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 #: 24047A4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
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)						
1915 ICV	ICP/MS (Initial calibration)	As	41.52	40.0	104	104	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
0302 CCV	ICP/MS (Continuing calibration)	As	50.37	50.0	101	101	
	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 #: 24047A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
2nd Reviewer: [illegible]

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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
1931 ICSAB	ICP interference check	As	103.30 (ug/L)	100 (ug/L)	103	103	Y
0248 LCS	Laboratory control sample	As	20.04 (mg/kg)	20.0 (mg/kg)	100	100	↓
-	Matrix spike	-	(SSR-SR) -	-	-	-	-
-	Duplicate	-	-	-	-	-	-
-	ICP serial dilution	-	-	-	-	-	-

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 #: 24047A4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #1, 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:

$$\frac{(12.23\ \mu g/L)(0.100\ L)(5)}{(1.07\ g)(0.975)} = 5.86\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	1	As	5.9	5.9	Y

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 7 through August 9, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6223-1

Sample Identification

SSAJ3-02-12BPC
SSAJ3-02-15BPC
SSAJ3-02-8BPC**
SSAJ3-02-8BPC_FD
EB-08072010
SSAI3-04-11BPC
SSAI3-04-14BPC
SSAI3-04-14BPC_FD
SSAI3-02-11BPC
SSAI3-02-14BPC
SSAI3-02-5BPC_FD
SSAI3-03-11BPC
SSAI3-03-14BPC
SSAI3-02-1BPC
SSAI3-02-5BPC
SSAI3-02-8BPC
SSAI3-03-1BPC
SSAI3-03-5BPC**
SSAI3-03-8BPC
SSAI3-04-1BPC
SSAI3-04-5BPC
SSAI3-04-8BPC
SSAJ3-02-12BPCMS
SSAJ3-02-12BPCMSD
SSAI3-03-8BPCMS
SSAI3-03-8BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 25 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.

Sample EB-08072010 was identified as an equipment blank. No arsenic 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.

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 280-6223-1	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 SSAJ3-02-8BPC** and SSAJ3-02-8BPC_FD, samples SSAI3-04-14BPC and SSAI3-04-14BPC_FD, and samples SSAI3-02-5BPC_FD and SSAI3-02-5BPC 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
	SSAJ3-02-8BPC**	SSAJ3-02-8BPC_FD				
Arsenic	3.5	2.9	15 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-04-14BPC	SSAI3-04-14BPC_FD				
Arsenic	3.5	3	15 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-02-5BPC_FD	SSAI3-02-5BPC				
Arsenic	2.5	3.1	21 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-6223-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6223-1	SSAJ3-02-12BPC SSAJ3-02-15BPC SSAJ3-02-8BPC** SSAJ3-02-8BPC_FD EB-08072010 SSAI3-04-11BPC SSAI3-04-14BPC SSAI3-04-14BPC_FD SSAI3-02-11BPC SSAI3-02-14BPC SSAI3-02-5BPC_FD SSAI3-03-11BPC SSAI3-03-14BPC SSAI3-02-1BPC SSAI3-02-5BPC SSAI3-02-8BPC SSAI3-03-1BPC SSAI3-03-5BPC** SSAI3-03-8BPC SSAI3-04-1BPC SSAI3-04-5BPC SSAI3-04-8BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047B4
SDG #: 280-6223-1
Laboratory: Test America

Date: 10-5-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: W

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: 8-7-10 through 8-9-10
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/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
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	D=3+4, D=7+8, D=11+15
XV	Field Blanks	ND	EB=5

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 1	SSAJ3-02-12BPC	11 1	SSAI3-02-5BPC_FD	21 2	SSAI3-04-5BPC	31	
2 1	SSAJ3-02-15BPC	12 1	SSAI3-03-11BPC	22 2	SSAI3-04-8BPC	32	
3 1	SSAJ3-02-8BPC **	13 2	SSAI3-03-14BPC MH	23 1	SSAJ3-02-12BPCMS	33	
4 1	SSAJ3-02-8BPC_FD	14 2	SSAI3-02-1BPC	24 1	SSAJ3-02-12BPCMSD	34	
5 3	EB-08072010 W	15 2	SSAI3-02-5BPC	25 2	SSAI3-03-8BPCMS	35	
6 1	SSAI3-04-11BPC	16 2	SSAI3-02-8BPC	26 2	SSAI3-03-8BPCMSD	36	
7 1	SSAI3-04-14BPC	17 2	SSAI3-03-1BPC	27		37	
8 1	SSAI3-04-14BPC_FD	18 2	SSAI3-03-5BPC**	28 1	PBS1	38	
9 1	SSAI3-02-11BPC	19 2	SSAI3-03-8BPC	29 2	PBS2	39	
10 1	SSAI3-02-14BPC	20 2	SSAI3-04-1BPC	30 3	PBW	40	

Notes:

LDC #: 24047B4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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#: 24047B4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

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

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

Analyte	Concentration (mg/kg) 3	Concentration (mg/kg) 4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.5	2.9	15			

Analyte	Concentration (mg/kg) 7	Concentration (mg/kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.5	3.0	15			

Analyte	Concentration (mg/kg) 11	Concentration (mg/kg) 15	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.5	3.1	21			

LDC #: 24047B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
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)						
1728 ICV	ICP/MS (Initial calibration)	As	41.61	40.0	104	104	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
2008 CCV	ICP/MS (Continuing calibration)	As	50.66	50.0	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 #: 24047B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
1745 ICSAB	ICP interference check	As	103.20 (ug/L)	100 (ug/L)	103	103	Y
1946 LCS1	Laboratory control sample	As	20.00 (mg/kg)	20.0 (mg/kg)	100	100	
1957 23	Matrix spike	As	(SSR-SR) 20.54 (mg/kg)	19.5 (mg/kg)	105	105	
1957/1959 23/24	Duplicate	As	22.36 (mg/kg)	21.66 (mg/kg)	3	3	
2108/2111 19	ICP serial dilution	As	3.51 (mg/kg)	3.70 (mg/kg)	5.4	5.7	

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 #: 24047B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #3, 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:

$$\frac{(7.73\ \mu g/L)(0.100L)(5)}{(1.19\ g)(0.930)} = 3.49\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	3	As	3.5	3.5	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 9, 2010

LDC Report Date: October 13, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6290-2

Sample Identification

SSAQ4-10-2BPC
SSAQ4-10-3BPC
SSAQ4-10-4BPC

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 sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6290-2	All analytes reported below the PQL.	J (all detects)	A

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 280-6290-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6290-2	SSAQ4-10-2BPC SSAQ4-10-3BPC SSAQ4-10-4BPC	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 280-6290-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-6290-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 24047C4
SDG #: 280-6290-2
Laboratory: Test America

Date: 10-5-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: V

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: 8-9-10
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	N	
XV	Field Blanks	N	~~EB = EB-08092010 (SDG: 280-6290-1)~~

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:
all soil

1	SSAQ4-10-2BPC	11		21		31	
2	SSAQ4-10-3BPC	12		22		32	
3	SSAQ4-10-4BPC	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	PBS	20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 9, 2010

LDC Report Date: October 8, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6290-3

Sample Identification

SSAQ4-08-9BPC
SSAQ4-08-9BPCMS
SSAQ4-08-9BPCMSD

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.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAQ4-08-9BPCMS/MSD (All samples in SDG 280-6290-3)	Arsenic	16 (75-125)	42 (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 sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6290-3	All analytes reported below the PQL.	J (all detects)	A

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 280-6290-3

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6290-3	SSAQ4-08-9BPC	Arsenic	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-6290-3	SSAQ4-08-9BPC	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 280-6290-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-6290-3

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 24047D4
SDG #: 280-6290-3
Laboratory: Test America

Stage ~~2B~~ 4

Date: 10-5-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: ~~MG~~

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: 8-9-10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/MSD
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	~~EB=EB-08092010 (SDG: 280-6290-1)~~

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: Soil

1	SSAQ4-08-9BPC	11		21		31	
2	SSAQ4-08-9BPCMS	12		22		32	
3	SSAQ4-08-9BPCMSD	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	PBS	20		30		40	

Notes: _____

LDC #: 24047D4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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 #: 24047D4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MG
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
1	2/3	Soil	As	16 (75-125)	42 (75-125)		all	* J-/UJ/A m

Comments: * post digestion spike is in limit

LDC #: 24047D4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
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)						
1910 ICV	ICP/MS (Initial calibration)	As	41.31	40.0	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
0842 CCV	ICP/MS (Continuing calibration)	As	51.09	50.0	102	102	
	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 #: 24047D4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
2224 ICSAB	ICP interference check	As	101.40 (µg/L)	100 (µg/L)	101	101	Y
0851 LCS	Laboratory control sample	As	18.14 (mg/kg)	20.0 (mg/kg)	91	91	
0902 2	Matrix spike	As	(SSR-SR) 3.04 (mg/kg)	19.3 (mg/kg)	16	16	
0902 / 0905 2/3	Duplicate	As	48.43 (mg/kg)	54.06 (mg/kg)	11	11	
0854 / 0856 1	ICP serial dilution	As	45.39 (mg/kg)	45.97 (mg/kg)	1.3	1.3	

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 #: 24047D4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #1, 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:

$$\frac{(89.32\ \mu g/L)(0.100\ L)(5)}{(1.08\ g)(0.911)} = 45.39\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	1	As	45	45	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 10, 2010

LDC Report Date: October 27, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6345-1

Sample Identification

SSAJ3-07-SW-E-1BPC**	SB01-24BPCMSD
SSAJ3-05-SW-E-1BPC	
SSAJ3-02-SW-E-1BPC	
SSAI3-04-SW-E-1BPC	
SSAI3-03-SW-E-1BPC	
SSAI3-02-SW-E-1BPC_FD	
SSAI3-02-SW-E-1BPC	
SSAI3-02-SW-W-1BPC	
SSAI3-03-SW-W-1BPC	
SSAI3-04-SW-W-1BPC	
SSAJ3-02-SW-W-1BPC	
SSAJ3-05-SW-W-1BPC	
SSAJ3-07-SW-W-1BPC**	
SSAJ3-07-SW-W-1BPC_FD	
SB01-24BPC	
SB02-24BPC**	
SB01-24BPC_FD	
SSAJ3-02-SW-W-1BPCMS	
SSAJ3-02-SW-W-1BPCMSD	
SB01-24BPCMS	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 21 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010, 6020, and 7000 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

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

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

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)	Zinc	0.430 mg/Kg	SB01-24BPC SB02-24BPC**
ICB/CCB	Antimony	3.42 ug/L	SB01-24BPC SB02-24BPC**
ICB/CCB	Selenium	5.55 ug/L	SB01-24BPC SB02-24BPC** SB01-24BPC_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	Analyte	Reported Concentration	Modified Final Concentration
SB02-24BPC**	Antimony	0.56 mg/Kg	2.0U mg/Kg

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 280-6345-1	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 SSAI3-02-SW-E-1BPC_FD and SSAI3-02-SW-E-1BPC, samples SSAJ3-07-SW-W-1BPC** and SSAJ3-07-SW-W-1BPC_FD, and samples SB01-24BPC and SB01-24BPC_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
	SSAI3-02-SW-E-1BPC_FD	SSAI3-02-SW-E-1BPC				
Arsenic	2.8	2.7	-	0.1 (≤0.57)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-07-SW-W-1BPC**	SSAJ3-07-SW-W-1BPC_FD				
Arsenic	2.6	3.1	-	0.5 (≤0.61)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SB01-24BPC	SB01-24BPC_FD				
Arsenic	6.6	6.6	-	0 (≤1.9)	-	-
Barium	130	120	8 (≤50)	-	-	-
Cadmium	0.043	0.055	-	0.012 (≤0.48)	-	-
Chromium	12	14	15 (≤50)	-	-	-
Lead	7.4	7.3	1 (≤50)	-	-	-

Analyte	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SB01-24BPC	SB01-24BPC_FD				
Mercury	6.3	7.2	-	0.9 (≤18)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Data Qualification Summary - SDG 280-6345-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6345-1	SSAJ3-07-SW-E-1BPC** SSAJ3-05-SW-E-1BPC SSAJ3-02-SW-E-1BPC SSAI3-04-SW-E-1BPC SSAI3-03-SW-E-1BPC SSAI3-02-SW-E-1BPC_FD SSAI3-02-SW-E-1BPC SSAI3-02-SW-W-1BPC SSAI3-03-SW-W-1BPC SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD SB01-24BPC SB02-24BPC** SB01-24BPC_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 280-6345-1

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-6345-1	SB02-24BPC**	Antimony	2.0U mg/Kg	A	bl

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG 280-6345-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047E4
SDG #: 280-6345-1
Laboratory: Test America

Date: 10-6-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-10-10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/MSD
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	D=6+7 D=13+14 D=15+17
XV	Field Blanks	N	~~EB=EB-08102010 (from 280-6990-1)~~

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 Soil

1	1	SSAJ3-07-SW-E-1BPC**	11	1	SSAJ3-02-SW-W-1BPC	21	2	SB01-24BPCMSD	31	
2	1	SSAJ3-05-SW-E-1BPC	12	1	SSAJ3-05-SW-W-1BPC	22			32	
3	1	SSAJ3-02-SW-E-1BPC	13	1	SSAJ3-07-SW-W-1BPC **	23		9m4	33	
4	1	SSAI3-04-SW-E-1BPC	14	1	SSAJ3-07-SW-W-1BPC_FD**	24		↓	34	
5	1	SSAI3-03-SW-E-1BPC	15	2	SB01-24BPC	25			35	
6	1	SSAI3-02-SW-E-1BPC_FD	16	2	SB02-24BPC**	26			36	
7	1	SSAI3-02-SW-E-1BPC	17	2	SB01-24BPC_FD	27			37	
8	1	SSAI3-02-SW-W-1BPC	18	1	SSAJ3-02-SW-W-1BPCMS	28			38	
9	1	SSAI3-03-SW-W-1BPC	19	1	SSAJ3-02-SW-W-1BPCMSD	29	1	PBS1	39	
10	1	SSAI03-04-SW-W-1BPC	20	2	SB01-24BPCMS	30	2	PBS2	40	

Notes:

LDC #: 24047E4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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 anayized 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 #: 24047E4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1 → 14	S	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^-, ___
15, 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^-, ___
17		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 18, 19		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^-, ___
↓ 20, 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^-, ___
		Analysis Method
ICP	S	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 #: 24047E4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x Code: bl
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15, 16

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	16									
Sb			3.42		0.56/ 2.0U									
Zn	0.430													

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x 2nd Reviewer:
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15-17 (ND)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qual's.									
Se			5.55											

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#: 24047E4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: V

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

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

Analyte	Concentration (mg/kg) 6	Concentration (mg/kg) 7	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.8	2.7		0.1	(≤0.57)	

V:\FIELD DUPLICATES\FD_inorganic\24047E4.wpd

Analyte	Concentration (mg/kg) 13	Concentration (mg/kg) 14	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.6	3.1		0.5	(≤0.61)	

V:\FIELD DUPLICATES\FD_inorganic\24047E4.wpd

Analyte	Concentration (mg/kg) 15	Concentration (mg/kg) 17	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	6.6	6.6		0	(≤1.9)	
Barium	130	120	8			
Cadmium	0.043	0.055		0.012	(≤0.48)	
Chromium	12	14	15			
Lead	7.4	7.3	1			
Mercury (ug/Kg)	6.3	7.2		0.9	(≤18)	

V:\FIELD DUPLICATES\FD_inorganic\24047E4.wpd

LDC #: 24047E4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
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)						
1830 ICV	ICP/MS (Initial calibration)	As	40.54	40.0	101	101	Y
1134 ICV	CVAA (Initial calibration)	Hg	6.664	7.00	95	95	
	ICP (Continuing calibration)						
1857 CCV	ICP/MS (Continuing calibration)	As	50.12	50.0	100	100	
1140 CCV	CVAA (Continuing calibration)	Hg	5.044	5.00	101	101	
	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 #: 24047E4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
2nd Reviewer: [illegible]

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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
1846 ICSAB	ICP interference check	As	99.61 (ug/L)	100 (ug/L)	99.6	99.6	Y
1908 LCS1	Laboratory control sample	As	20.03 (mg/kg)	20.0 (mg/kg)	100	100	
2009 18	Matrix spike	As	(SSR-SR) 17.84 (mg/kg)	19.3 (mg/kg)	92	92	
2009/2011 18/19	Duplicate	As	20.98 (mg/kg)	21.07 (mg/kg)	0	0	
2000/2003 11	ICP serial dilution	As	3.13 (mg/kg)	3.34 (mg/kg)	6.7	6.4	

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 #: 24047E4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #1, 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:

$$\frac{(6.22\ \mu g/L)(0.100\ L)(5)}{(1.04\ g)\ (0.950)} = 3.148\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	1	As	3.1	3.1	Y
2	16	Hg	350 (mg/kg)	350 (mg/kg)	↓

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 17, 2010

LDC Report Date: October 8, 2010

Matrix: Soil

Parameters: Arsenic & Manganese

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6583-1

Sample Identification

BDT-4-N-15-16.0BPC
BDT-4-N-15-18.0BPC**
BDT-4-N-15-12.0BPC
BDT-4-N-15-14.0BPC
BDT-4-N-15-8.0BPC
BDT-4-N-15-10.0BPC
BDT-4-N-20-10.0BPC
BDT-4-N-20-12.0BPC
BDT-4-N-20-14.0BPC
BDT-4-N-20-16.0BPC
BDT-4-N-20-18.0BPC**
BDT-4-N-20-2.0BPC
BDT-4-N-20-4.0BPC
BDT-4-N-20-6.0BPC
BDT-4-N-20-8.0BPC
BDT-4-N-20-6.0BPC_FD
BDT-4-N-15-16.0BPCMS
BDT-4-N-15-16.0BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 18 soil samples 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	0.0497 mg/Kg	All samples in SDG 280-6583-1

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.

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 280-6583-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-N-20-6.0BPC and BDT-4-N-20-6.0BPC_FD were identified as field duplicates. No arsenic or manganese was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-N-20-6.0BPC	BDT-4-N-20-6.0BPC_FD				
Arsenic	2.9	2.9	-	0 (≤0.65)	-	-
Manganese	330	380	14 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Data Qualification Summary - SDG 280-6583-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6583-1	BDT-4-N-15-16.0BPC BDT-4-N-15-18.0BPC** BDT-4-N-15-12.0BPC BDT-4-N-15-14.0BPC BDT-4-N-15-8.0BPC BDT-4-N-15-10.0BPC BDT-4-N-20-10.0BPC BDT-4-N-20-12.0BPC BDT-4-N-20-14.0BPC BDT-4-N-20-16.0BPC BDT-4-N-20-18.0BPC** BDT-4-N-20-2.0BPC BDT-4-N-20-4.0BPC BDT-4-N-20-6.0BPC BDT-4-N-20-8.0BPC	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 280-6583-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-6583-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047G4
SDG #: 280-6583-1
Laboratory: Test America

Date: 10-7-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-17-10
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/MSD (Mn %o rec / 4 x rule, no qual.)
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	D = 14 + 16
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 soil

1	BDT-4-N-15-16.0BPC	11	BDT-4-N-20-18.0BPC**	21		31	
2	BDT-4-N-15-18.0BPC**	12	BDT-4-N-20-2.0BPC	22		32	
3	BDT-4-N-15-12.0BPC	13	BDT-4-N-20-4.0BPC	23		33	
4	BDT-4-N-15-14.0BPC	14	BDT-4-N-20-6.0BPC	24		34	
5	BDT-4-N-15-8.0BPC	15	BDT-4-N-20-8.0BPC	25		35	
6	BDT-4-N-15-10.0BPC	16	BDT-4-N-20-6.0BPC_FD	26		36	
7	BDT-4-N-20-10.0BPC	17	BDT-4-N-15-16.0BPCMS	27		37	
8	BDT-4-N-20-12.0BPC	18	BDT-4-N-15-16.0BPCMSD	28		38	
9	BDT-4-N-20-14.0BPC	19		29		39	
10	BDT-4-N-20-16.0BPC	20	PBS	30		40	

Notes: _____

LDC #: 24047G4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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 #: 24047G4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→16	S	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 17, 18	↓	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	S	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 #: 24047G4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: MG
2nd Reviewer:

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

Soil preparation factor applied: 100x
Associated Samples: All (>RL)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qual's.									
~~As~~														
Mn	0.0497													

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#: 24047G4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer:

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

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

Analyte	Concentration (mg/kg) 14	Concentration (mg/kg) 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.9	2.9		0	(≤0.65)	
Manganese	330	380	14			

V:\FIELD DUPLICATES\FD_inorganic\24047G4.wpd

LDC #: 24047G4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
2nd Reviewer: [signature]

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)						
1857 ICV	ICP/MS (Initial calibration)	As	41.60	40.0	104	104	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
2336 CCV	ICP/MS (Continuing calibration)	Mn	49.37	50.0	99	99	
	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 #: 24047G4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
2303 ICSAB	ICP interference check	As	103.40 (µg/L)	100 (µg/L)	103	103	Y
2319 LCS	Laboratory control sample	Mn	19.50 (mg/kg)	20.0 (mg/kg)	98	97	↓
2330 17	Matrix spike	As	(SSR-SR) 19.74 (mg/kg)	21.7 (mg/kg)	91	91	↓
2330/2333 17/18	Duplicate	Mn	315.34 (mg/kg)	310.17 (mg/kg)	2	2	↓
2322/2325 1	ICP serial dilution	Mn	270.61 (mg/kg)	275.67 (mg/kg)	1.9	1.9	↓

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 #: 24047G4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #2, 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:

$$\frac{(11.00\ \mu g/L)(0.100\ L)(5)}{(1.04\ g)(0.901)} = 5.87\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	2	As	5.9	5.9	Y
		Mn	280.	280	↓

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 24, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Arsenic & Manganese

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6783-1

Sample Identification

EB-08242010	BDT-4-N-5-8BPCMS
BDT-4-S-5-10BPC	BDT-4-N-5-8BPCMSD
BDT-4-S-5-12BPC	
BDT-4-S-5-14BPC	
BDT-4-S-5-16BPC	
BDT-4-S-5-18BPC	
BDT-4-S-5-2BPC	
BDT-4-S-5-4BPC	
BDT-4-S-5-6BPC	
BDT-4-S-5-8BPC	
BDT-4-S-5-16BPC_FD	
BDT-4-N-5-10BPC	
BDT-4-N-5-12BPC	
BDT-4-N-5-14BPC	
BDT-4-N-5-16BPC	
BDT-4-N-5-18BPC**	
BDT-4-N-5-2BPC	
BDT-4-N-5-4BPC	
BDT-4-N-5-6BPC	
BDT-4-N-5-8BPC	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 21 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	0.0434 mg/Kg	All samples in SDG 280-6783-1

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

Sample EB-08242010 was identified as an equipment blank. No arsenic or manganese was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-08242010	8/24/10	Manganese	12 ug/L	All samples in SDG 280-6783-1

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.

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 280-6783-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples BDT-4-S-5-16BPC and BDT-4-S-5-16BPC_FD were identified as field duplicates. No arsenic or mangnese was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-4-S-5-16BPC	BDT-4-S-5-16BPC_FD				
Arsenic	4.3	4.2	2 (≤50)	-	-	-
Manganese	360	340	6 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Data Qualification Summary - SDG 280-6783-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6783-1	EB-08242010 BDT-4-S-5-10BPC BDT-4-S-5-12BPC BDT-4-S-5-14BPC BDT-4-S-5-16BPC BDT-4-S-5-18BPC BDT-4-S-5-2BPC BDT-4-S-5-4BPC BDT-4-S-5-6BPC BDT-4-S-5-8BPC BDT-4-S-5-16BPC_FD BDT-4-N-5-10BPC BDT-4-N-5-12BPC BDT-4-N-5-14BPC BDT-4-N-5-16BPC BDT-4-N-5-18BPC** BDT-4-N-5-2BPC BDT-4-N-5-4BPC BDT-4-N-5-6BPC BDT-4-N-5-8BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-6783-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Equipment Blank Data Qualification Summary - SDG 280-6783-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047K4
SDG #: 280-6783-1
Laboratory: Test America

Date: 10-8-10
Page: 1 of 1
Reviewer: MG
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: 8-24-10
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 / MSD (Mn % rec / 4x, ok)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS / LCSD
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	D = 5 + 11
XV	Field Blanks	SW	EB = 1

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

1	EB-08242010 W	11	BDT-4-S-5-16BPC_FD S	21	BDT-4-N-5-8BPCMS S	31	
2	BDT-4-S-5-10BPC S	12	BDT-4-N-5-10BPC	22	BDT-4-N-5-8BPCMSD	32	
3	BDT-4-S-5-12BPC	13	BDT-4-N-5-12BPC	23		33	
4	BDT-4-S-5-14BPC	14	BDT-4-N-5-14BPC	24		34	
5	BDT-4-S-5-16BPC	15	BDT-4-N-5-16BPC	25		35	
6	BDT-4-S-5-18BPC	16	BDT-4-N-5-18BPC**	26		36	
7	BDT-4-S-5-2BPC	17	BDT-4-N-5-2BPC	27		37	
8	BDT-4-S-5-4BPC	18	BDT-4-N-5-4BPC	28		38	
9	BDT-4-S-5-6BPC	19	BDT-4-N-5-6BPC	29	PBW	39	
10	BDT-4-S-5-8BPC	20	BDT-4-N-5-8BPC	30	PBS	40	

MS

Notes:

LDC #: 24047K4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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 #: 24047K4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→20	S/W	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 21,22	S	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	S/W	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 #: 24047K4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: MG
2nd Reviewer:

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

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qual's.									
Mn	0.0434													

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 #: 24047K4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
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
Sampling date: 8-24-10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / (Other) EB Associated Samples: All soil (>10x)

Analyte	Blank ID	Sample Identification										
	1	Action Level	No Qual's.									
Mn	12	12										

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#: 24047K4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: ~

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

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

Analyte	Concentration (mg/kg) 5	Concentration (mg/kg) 11	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	4.3	4.2	2			
Manganese	360	340	6			

V:\FIELD DUPLICATES\FD_inorganic\24047K4.wpd

LDC #: 24047K4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
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)
I	ICP (Initial calibration)						
1832 ICV	ICP/MS (Initial calibration)	Mn	41.23	40.0	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1938 CCV	ICP/MS (Continuing calibration)	As	49.98	50.0	100	100	↓
	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 #: 24047 K4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
1851 ICSAB	ICP interference check	Mn	98.34 (µg/L)	100 (µg/L)	98	98	Y
1916 LCS	Laboratory control sample	As	19.74 (mg/kg)	20.0 (mg/kg)	99	99	↓
2028 21	Matrix spike	Mn	(SSR-SR) 35.46 (mg/kg)	19.5 (mg/kg)	182	182	↓
2028 / 2030 21/22	Duplicate	As	21.78 (mg/kg)	20.19 (mg/kg)	8	8	↓
2020 / 2022 20	ICP serial dilution	Mn	361.79 (mg/kg)	377.01 (mg/kg)	4.2	4.2	↓

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 #: 24047K4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #16, Mn were recalculated and verified using the following equation:

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

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

Recalculation:

$$\frac{(625.50\ \mu g/L)(0.100\ L)(5)}{(1.02\ g)(0.913)} = 335.84\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	16	As	6.1	6.1	Y
		Mn	340	340	↓

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 25, 2010

LDC Report Date: October 11, 2010

Matrix: Soil/Water

Parameters: Arsenic & Manganese

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6818-1

Sample Identification

BDT-2-N-20-10.0BPC
BDT-2-N-20-12.0BPC
BDT-2-N-20-14.0BPC
BDT-2-N-20-2.0BPC
BDT-2-N-20-4.0BPC
BDT-2-N-20-6.0BPC
BDT-2-N-20-8.0BPC
BDT-2-N-20-12.0BPC_FD
BDT-2-N-15-10.0BPC
BDT-2-N-15-12.0BPC
BDT-2-N-15-14.0BPC**
BDT-2-N-15-2.0BPC
BDT-2-N-15-4.0BPC
BDT-2-N-15-6.0BPC
BDT-2-N-15-8.0BPC
BDT-2-N-5-10BPC
BDT-2-N-5-12BPC
BDT-2-N-5-14BPC**
BDT-2-N-5-12BPC_FD
BDT-2-N-5-8BPC
BDT-2-N-5-2BPC
BDT-2-N-5-4BPC
BDT-2-N-5-6BPC
BDT-2-N-10-10BPC
BDT-2-N-10-12BPC
BDT-2-N-10-14BPC**
BDT-2-N-10-2BPC
BDT-2-N-10-4BPC
BDT-2-N-10-6BPC
BDT-2-N-10-8BPC
BDT-2-N-10-6BPC_FD
EB-08252010
BDT-2-N-15-6.0BPCMS
BDT-2-N-15-6.0BPCMSD
BDT-2-N-5-10BPCMS
BDT-2-N-5-10BPCMSD

**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 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.

Sample EB-08252010 was identified as an equipment blank. No arsenic or manganese 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.

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 280-6818-1	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-2-N-20-12.0BPC and BDT-2-N-20-12.0BPC_FD and samples BDT-2-N-5-12BPC and BDT-2-N-5-12BPC_FD and samples BDT-2-N-10-6BPC and BDT-2-N-10-6BPC_FD were identified as field duplicates. No arsenic or manganese was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-N-20-12.0BPC	BDT-2-N-20-12.0BPC_FD				
Arsenic	4.6	4.2	9 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-N-5-12BPC	BDT-2-N-5-12BPC_FD				
Arsenic	5.8	5.4	7 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-N-10-6BPC	BDT-2-N-10-6BPC_FD				
Arsenic	3.4	3.2	-	0.2 (≤0.66)	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Data Qualification Summary - SDG 280-6818-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6818-1	BDT-2-N-20-10.0BPC BDT-2-N-20-12.0BPC BDT-2-N-20-14.0BPC BDT-2-N-20-2.0BPC BDT-2-N-20-4.0BPC BDT-2-N-20-6.0BPC BDT-2-N-20-8.0BPC BDT-2-N-20-12.0BPC_FD BDT-2-N-15-10.0BPC BDT-2-N-15-12.0BPC BDT-2-N-15-14.0BPC** BDT-2-N-15-2.0BPC BDT-2-N-15-4.0BPC BDT-2-N-15-6.0BPC BDT-2-N-15-8.0BPC BDT-2-N-5-10BPC BDT-2-N-5-12BPC BDT-2-N-5-14BPC** BDT-2-N-5-12BPC_FD BDT-2-N-5-8BPC BDT-2-N-5-2BPC BDT-2-N-5-4BPC BDT-2-N-5-6BPC BDT-2-N-10-10BPC BDT-2-N-10-12BPC BDT-2-N-10-14BPC** BDT-2-N-10-2BPC BDT-2-N-10-4BPC BDT-2-N-10-6BPC BDT-2-N-10-8BPC BDT-2-N-10-6BPC_FD EB-08252010	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 280-6818-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic & Manganese - Equipment Blank Data Qualification Summary - SDG 280-6818-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047L4
SDG #: 280-6818-1
Laboratory: Test America

Date: 10-8-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: MW

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-25-10
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/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
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	D=2+8, D=17+19, D=29+31
XV	Field Blanks	ND	EB=32

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	1	BDT-2-N-20-10.0BPC	S	11	1	BDT-2-N-15-14.0BPC**	S	21	2	BDT-2-N-5-2BPC	S
2	1	BDT-2-N-20-12.0BPC		12	1	BDT-2-N-15-2.0BPC	MS	22	2	BDT-2-N-5-4BPC	
3	1	BDT-2-N-20-14.0BPC		13	1	BDT-2-N-15-4.0BPC		23	2	BDT-2-N-5-6BPC	
4	1	BDT-2-N-20-2.0BPC		14	1	BDT-2-N-15-6.0BPC		24	2	BDT-2-N-10-10BPC	
5	1	BDT-2-N-20-4.0BPC		15	1	BDT-2-N-15-8.0BPC		25	2	BDT-2-N-10-12BPC	
6	1	BDT-2-N-20-6.0BPC		16	2	BDT-2-N-5-10BPC		26	2	BDT-2-N-10-14BPC**	
7	1	BDT-2-N-20-8.0BPC		17	2	BDT-2-N-5-12BPC		27	2	BDT-2-N-10-2BPC	
8	1	BDT-2-N-20-12.0BPC_FD		18	2	BDT-2-N-5-14BPC**		28	2	BDT-2-N-10-4BPC	
9 MS	1	BDT-2-N-15-10.0BPC		19	2	BDT-2-N-5-12BPC_FD		29	2	BDT-2-N-10-6BPC	
10	1	BDT-2-N-15-12.0BPC		20	2	BDT-2-N-5-8BPC		30	2	BDT-2-N-10-8BPC	

31	2	BDT-2-N-10-6BPC_FD	S	32	3	EB-08252010	W
33	1	BDT-2-N-15-6.0BPCMS	S				
34	1	BDT-2-N-15-6.0BPCMSD					
35	2	BDT-2-N-5-10BPCMS					
36	2	BDT-2-N-5-10BPCMSD					
37							
38	1	PBS1					
39	2	PBS2					
40	3	PBW					

Notes: _____

LDC #: 24047L4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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?	✓			

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#: 24047L4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: L

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

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

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	2	8				
Arsenic	4.6	4.2	9			

V:\FIELD DUPLICATES\FD_inorganic\24047L4.wpd

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	17	19				
Arsenic	5.8	5.4	7			

V:\FIELD DUPLICATES\FD_inorganic\24047L4.wpd

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	29	31				
Arsenic	3.4	3.2		0.2	(≤0.66)	

V:\FIELD DUPLICATES\FD_inorganic\24047L4.wpd

LDC #: 24047L4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
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)						
1953 ICV	ICP/MS (Initial calibration)	As	41.06	40.0	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
2302 CCV	ICP/MS (Continuing calibration)	As	49.68	50.0	99	99	
	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 #: 24047L4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
2009 ICSAB	ICP interference check	As	101.50 (µg/L)	100 (µg/L)	102	102	Y
2245 LCS2	Laboratory control sample	As	18.31 (mg/kg)	20.0 (mg/kg)	92	92	
2256 35	Matrix spike	As	(SSR-SR) 19.52 (mg/kg)	19.7 (mg/kg)	99	99	
2256/2259 35/36	Duplicate	As	22.93 (mg/kg)	23.62 (mg/kg)	3	3	
2248/2251 16	ICP serial dilution	As	3.41 (mg/kg)	3.43 (mg/kg)	0.59	0.35	

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 #: 24047L4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #18, 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:

$$\frac{(12.12\ \mu g/L)(0.100\ L)(5)}{(1.02)\ (0.929)} = 6.40\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	18	As	6.4	6.4	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 26, 2010

LDC Report Date: October 11, 2010

Matrix: Soil/Water

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6851-1

Sample Identification

BDT-2-S-20-10BPC	BDT-2-S-5-8BPC
BDT-2-S-20-12BPC	BDT-2-S-5-2BPC
BDT-2-S-20-14BPC**	BDT-2-S-5-4BPC
BDT-2-S-20-2BPC	BDT-2-S-5-6BPC
BDT-2-S-20-4BPC	BDT-2-S-10-10BPC
BDT-2-S-20-6BPC	BDT-2-S-10-12BPC
BDT-2-S-20-6BPC_FD	BDT-2-S-10-14BPC**
BDT-2-S-20-8BPC	BDT-2-S-10-2BPC
BDT-2-S-15-10BPC	BDT-2-S-10-4BPC
BDT-2-S-15-12BPC	BDT-2-S-10-6BPC
BDT-2-S-15-14BPC**	BDT-2-S-10-8BPC
BDT-2-S-15-2BPC	EB-08262010
BDT-2-S-15-4BPC	BDT-2-S-20-10BPCMS
BDT-2-S-15-6BPC	BDT-2-S-20-10BPCMSD
BDT-2-S-15-8BPC	BDT-2-S-5-10BPCMS
BDT-2-S-15-2BPC_FD	BDT-2-S-5-10BPCMSD
BDT-2-S-5-10BPC	
BDT-2-S-5-12BPC	
BDT-2-S-5-14BPC**	
BDT-2-S-5-12BPC_FD	

**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.

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.

Sample EB-08262010 was identified as an equipment blank. No arsenic 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.

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 280-6851-1	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-2-S-20-6BPC and BDT-2-S-20-6BPC_FD and samples BDT-2-S-15-2BPC and BDT-2-S-15-2BPC_FD and samples BDT-2-S-5-12BPC and BDT-2-S-5-12BPC_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
	BDT-2-S-20-6BPC	BDT-2-S-20-6BPC_FD				
Arsenic	3.3	3.4	3 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-S-15-2BPC	BDT-2-S-15-2BPC_FD				
Arsenic	4.9	5.7	15 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-2-S-5-12BPC	BDT-2-S-5-12BPC_FD				
Arsenic	7.7	9.0	16 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-6851-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6851-1	BDT-2-S-20-10BPC BDT-2-S-20-12BPC BDT-2-S-20-14BPC** BDT-2-S-20-2BPC BDT-2-S-20-4BPC BDT-2-S-20-6BPC BDT-2-S-20-6BPC_FD BDT-2-S-20-8BPC BDT-2-S-15-10BPC BDT-2-S-15-12BPC BDT-2-S-15-14BPC** BDT-2-S-15-2BPC BDT-2-S-15-4BPC BDT-2-S-15-6BPC BDT-2-S-15-8BPC BDT-2-S-15-2BPC_FD BDT-2-S-5-10BPC BDT-2-S-5-12BPC BDT-2-S-5-14BPC** BDT-2-S-5-12BPC_FD BDT-2-S-5-8BPC BDT-2-S-5-2BPC BDT-2-S-5-4BPC BDT-2-S-5-6BPC BDT-2-S-10-10BPC BDT-2-S-10-12BPC BDT-2-S-10-14BPC** BDT-2-S-10-2BPC BDT-2-S-10-4BPC BDT-2-S-10-6BPC BDT-2-S-10-8BPC EB-08262010	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 280-6851-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-6851-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047M4
SDG #: 280-6851-1
Laboratory: Test America

Date: 10-8-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: [illegible]

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: 8-26-10
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/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
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	D=6+7, D=17+16, D=18+20
XV	Field Blanks	ND	EB=32

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	1	BDT-2-S-20-10BPC	S	11	1	BDT-2-S-15-14BPC**	S	21	2	BDT-2-S-5-8BPC	S	31	2	BDT-2-S-10-8BPC	S
2	1	BDT-2-S-20-12BPC		12	1	BDT-2-S-15-2BPC		22	2	BDT-2-S-5-2BPC		32	3	EB-08262010	W
3	1	BDT-2-S-20-14BPC**		13	1	BDT-2-S-15-4BPC		23	2	BDT-2-S-5-4BPC		33	1	BDT-2-S-20-10BPCMS	S
4	1	BDT-2-S-20-2BPC		14	1	BDT-2-S-15-6BPC		24	2	BDT-2-S-5-6BPC		34	1	BDT-2-S-20-10BPCMSD	
5	1	BDT-2-S-20-4BPC		15	1	BDT-2-S-15-8BPC		25	2	BDT-2-S-10-10BPC		35	2	BDT-2-S-5-10BPCMS	
6	1	BDT-2-S-20-6BPC		16	1	BDT-2-S-15-2BPC_FD		26	2	BDT-2-S-10-12BPC		36	2	BDT-2-S-5-10BPCMSD	
7	1	BDT-2-S-20-6BPC_FD		17	2	BDT-2-S-5-10BPC		27	2	BDT-2-S-10-14BPC**		37			
8	1	BDT-2-S-20-8BPC		18	2	BDT-2-S-5-12BPC		28	2	BDT-2-S-10-2BPC		38	1	PBS1	
9	1	BDT-2-S-15-10BPC		19	2	BDT-2-S-5-14BPC**		29	2	BDT-2-S-10-4BPC		39	2	PBS2	
10	1	BDT-2-S-15-12BPC		20	2	BDT-2-S-5-12BPC_FD		30	2	BDT-2-S-10-6BPC		40	3	PBW	

Notes: _____

LDC #: 24047M4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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#: 24047M4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer:

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

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

Analyte	Concentration (mg/kg) 6	7	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	3.3	3.4	3			

V:\FIELD DUPLICATES\FD_inorganic\24047M4.wpd

Analyte	Concentration (mg/kg) 12	16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	4.9	5.7	15			

V:\FIELD DUPLICATES\FD_inorganic\24047M4.wpd

Analyte	Concentration (mg/kg) 18	20	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	7.7	9.0	16			

V:\FIELD DUPLICATES\FD_inorganic\24047M4.wpd

LDC #: 24047M4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
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)						
1740 ICV	ICP/MS (Initial calibration)	As	41.18	40.0	103	103	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
0232 CCV	ICP/MS (Continuing calibration)	As	50.43	50.0	101	101	
	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 #: 24047M4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
0217 ICSAB	ICP interference check	As	103.30 (µg/L)	100 (µg/L)	103	103	Y
0215 LCS1	Laboratory control sample	As	18.28 (mg/kg)	20.0 (mg/kg)	91	91	
0227 33	Matrix spike	As	(SSR-SR) 18.11 (mg/kg)	22.0 (mg/kg)	82	82	
0227 / 0229 33 / 34	Duplicate	As	23.10 (mg/kg)	23.92 (mg/kg)	3	3	
0218 / 0221 1	ICP serial dilution	As	4.99 (mg/kg)	4.82 (mg/kg)	3.4	3.6	

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 #: 24047M4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #3, 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:

$$\frac{(12.92\ \mu g/L)(0.100\ L)(5)}{(1.02\ g)(0.925)} = 6.85\ \mu g/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	3	As	6.8	6.8	Y

Note:

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 11, 2010

Matrix: Soil/Water

Parameters: Lead

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6886-1

Sample Identification

BDT-1-N-20-10BPC	BDT-1-N-10-4BPC	BDT-1-N-15-4BPCMS
BDT-1-N-20-12BPC**	BDT-1-N-10-6BPC	BDT-1-N-15-4BPCMSD
BDT-1-N-20-14BPC	BDT-1-N-10-8BPC	BDT-1-S-20-4BPCMS
BDT-1-N-20-2BPC	BDT-1-N-10-8BPC_FD	BDT-1-S-20-4BPCMSD
BDT-1-N-20-4BPC	BDT-1-N-15-10BPC	BDT-1-S-20-14BPC_FDMS
BDT-1-N-20-6BPC	BDT-1-N-15-12BPC	BDT-1-S-20-14BPC_FDMSD
BDT-1-N-20-8BPC	BDT-1-N-15-14BPC**	
BDT-1-N-20-10BPC_FD	BDT-1-N-15-8BPC	
BDT-1-N-5-10BPC	BDT-1-N-15-2BPC	
BDT-1-N-5-12BPC	BDT-1-N-15-4BPC	
BDT-1-N-5-14BPC	BDT-1-N-15-6BPC	
BDT-1-N-5-8BPC_FD	BDT-1-S-20-10BPC	
BDT-1-N-5-8BPC	BDT-1-S-20-12BPC	
BDT-1-N-5-2BPC	BDT-1-S-20-14BPC**	
BDT-1-N-5-4BPC	BDT-1-S-20-2BPC	
BDT-1-N-5-6BPC	BDT-1-S-20-4BPC	
BDT-1-N-10-10BPC	BDT-1-S-20-6BPC	
BDT-1-N-10-12BPC	BDT-1-S-20-8BPC	
BDT-1-N-10-14BPC	BDT-1-S-20-14BPC_FD	
BDT-1-N-10-2BPC	EB-08272010	

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 45 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 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 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	0.0239 mg/Kg	BDT-1-N-20-10BPC BDT-1-N-20-12BPC** BDT-1-N-20-14BPC BDT-1-N-20-2BPC BDT-1-N-20-4BPC BDT-1-N-20-6BPC BDT-1-N-20-8BPC BDT-1-N-20-10BPC_FD BDT-1-N-5-10BPC BDT-1-N-5-12BPC BDT-1-N-5-14BPC BDT-1-N-5-8BPC_FD BDT-1-N-5-8BPC BDT-1-N-5-2BPC BDT-1-N-5-4BPC BDT-1-N-5-6BPC BDT-1-N-10-10BPC BDT-1-N-10-12BPC BDT-1-N-10-14BPC BDT-1-N-15-4BPC

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

Sample EB-08272010 was identified as an equipment blank. No 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.

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 280-6886-1	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-N-20-10BPC and BDT-1-N-20-10BPC_FD and samples BDT-1-N-5-8BPC_FD and BDT-1-N-5-8BPC and samples BDT-1-N-10-8BPC and BDT-1-N-10-8BPC_FD and samples BDT-1-S-20-14BPC** and BDT-1-S-20-14BPC_FD were identified as field duplicates. No 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-N-20-10BPC	BDT-1-N-20-10BPC_FD				
Lead	7.6	7.6	0 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-5-8BPC_FD	BDT-1-N-5-8BPC				
Lead	7.8	7.9	1 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-N-10-8BPC	BDT-1-N-10-8BPC_FD				
Lead	8.0	8.3	4 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	BDT-1-S-20-14BPC**	BDT-1-S-20-14BPC_FD				
Lead	8.7	8.1	7 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Lead - Data Qualification Summary - SDG 280-6886-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6886-1	BDT-1-N-20-10BPC BDT-1-N-20-12BPC** BDT-1-N-20-14BPC BDT-1-N-20-2BPC BDT-1-N-20-4BPC BDT-1-N-20-6BPC BDT-1-N-20-8BPC BDT-1-N-20-10BPC_FD BDT-1-N-5-10BPC BDT-1-N-5-12BPC BDT-1-N-5-14BPC BDT-1-N-5-8BPC_FD BDT-1-N-5-8BPC BDT-1-N-5-2BPC BDT-1-N-5-4BPC BDT-1-N-5-6BPC BDT-1-N-10-10BPC BDT-1-N-10-12BPC BDT-1-N-10-14BPC BDT-1-N-10-2BPC BDT-1-N-10-4BPC BDT-1-N-10-6BPC BDT-1-N-10-8BPC BDT-1-N-10-8BPC_FD BDT-1-N-15-10BPC BDT-1-N-15-12BPC BDT-1-N-15-14BPC** BDT-1-N-15-8BPC BDT-1-N-15-2BPC BDT-1-N-15-4BPC BDT-1-N-15-6BPC BDT-1-S-20-10BPC BDT-1-S-20-12BPC BDT-1-S-20-14BPC** BDT-1-S-20-2BPC BDT-1-S-20-4BPC BDT-1-S-20-6BPC BDT-1-S-20-8BPC BDT-1-S-20-14BPC_FD EB-08272010	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Lead - Laboratory Blank Data Qualification Summary - SDG 280-6886-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Lead - Equipment Blank Data Qualification Summary - SDG 280-6886-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N4
SDG #: 280-6886~~A~~1
Laboratory: Test America

Date: 10-8-10
Page: 1 of 2
Reviewer: MG
2nd Reviewer: W

METHOD: 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: 8-27-10
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/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
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	D = 1+8, D = 12+13, D = 23+24, D = 34+39
XV	Field Blanks	ND	EB = 40

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	1	BDT-1-N-20-10BPC	S	11	1	BDT-1-N-5-14BPC	S	21	2	BDT-1-N-10-4BPC	S	31	2	BDT-1-N-15-6BPC	S
2	1	BDT-1-N-20-12BPC**		12	1	BDT-1-N-5-8BPC_FD		22	2	BDT-1-N-10-6BPC		32	2	BDT-1-S-20-10BPC	
3	1	BDT-1-N-20-14BPC		13	1	BDT-1-N-5-8BPC		23	2	BDT-1-N-10-8BPC		33	2	BDT-1-S-20-12BPC	
4	1	BDT-1-N-20-2BPC		14	1	BDT-1-N-5-2BPC		24	2	BDT-1-N-10-8BPC_FD		34	2	BDT-1-S-20-14BPC**	
5	1	BDT-1-N-20-4BPC		15	1	BDT-1-N-5-4BPC		25	2	BDT-1-N-15-10BPC		35	2	BDT-1-S-20-2BPC	
6	1	BDT-1-N-20-6BPC		16	1	BDT-1-N-5-6BPC		26	2	BDT-1-N-15-12BPC		36	3	BDT-1-S-20-4BPC	
7	1	BDT-1-N-20-8BPC		17	1	BDT-1-N-10-10BPC		27	2	BDT-1-N-15-14BPC**		37	2	BDT-1-S-20-6BPC	
8	1	BDT-1-N-20-10BPC_FD		18	1	BDT-1-N-10-12BPC		28	2	BDT-1-N-15-8BPC		38	2	BDT-1-S-20-8BPC	
9	1	BDT-1-N-5-10BPC		19	1	BDT-1-N-10-14BPC		29	3	BDT-1-N-15-2BPC		39	2	BDT-1-S-20-14BPC_FD	
10	1	BDT-1-N-5-12BPC		20	2	BDT-1-N-10-2BPC		30	1	BDT-1-N-15-4BPC		40	4	EB-08272010	W

Notes: _____

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047N4
SDG #: 280-6886A1
Laboratory: Test America

Date: 10-8-10
Page: 2 of 2
Reviewer: MG
2nd Reviewer: [signature]

METHOD: 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		

see page 1 of 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

41 1	BDT-1-N-15-4BPCMS	51 1	PBS1	61		71	
42 1	BDT-1-N-15-4BPCMSD	52 2	PBS2	62		72	
43 3	BDT-1-S-20-4BPCMS	53 3	PBS3	63		73	
44 3	BDT-1-S-20-4BPCMSD	54 4	PBW	64		74	
45 2	BDT-1-S-20-14BPC_FDMS	55		65		75	
46 2	BDT-1-S-20-14BPC_FDMSD	56		66		76	
47		57		67		77	
48		58		68		78	
49		59		69		79	
50		60		70		80	

Notes: _____

LDC #: 24047N4

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
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?	✓			

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 #: 24047N4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: MG
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x, 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-19, 30 (>RL)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qual's.									
Pb	0.0239													

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#: 24047N4 **VALIDATION FINDINGS WORKSHEET**
Field Duplicates

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

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

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

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	1	8				
Lead	7.6	7.6	0			

V:\FIELD DUPLICATES\FD_inorganic\24047N4.wpd

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	13				
Lead	7.8	7.9	1			

V:\FIELD DUPLICATES\FD_inorganic\24047N4.wpd

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	23	24				
Lead	8.0	8.3	4			

V:\FIELD DUPLICATES\FD_inorganic\24047N4.wpd

Analyte	Concentration (mg/kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	34	39				
Lead	8.7	8.1	7			

V:\FIELD DUPLICATES\FD_inorganic\24047N4.wpd

LDC #: 24047N4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: AG
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)						
1953 ICV	ICP/MS (Initial calibration)	Pb	40.69	40.0	102	102	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
2108 CCV	ICP/MS (Continuing calibration)	Pb	49.49	50.0	99	99	
	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 #: 24047N4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
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)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
2009 ICSAB	ICP interference check	Pb	94.81 (ug/L)	100 (ug/L)	95	95	Y
2116 LCS1	Laboratory control sample	Pb	19.16 (mg/kg)	20.0 (mg/kg)	96	96	
2231 41	Matrix spike	Pb	(SSR-SR) 17.65 (mg/kg)	20.4 (mg/kg)	87	87	
2231 / 2234 41/42	Duplicate	Pb	27.95 (mg/kg)	27.21 (mg/kg)	3	3	
2223 / 2226 30	ICP serial dilution	Pb	10.30 (mg/kg)	10.68 (mg/kg)	3.7	3.6	

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 #: 24047N4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
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 #2, 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:

$$\frac{(12.06\ mg/L)(0.100L)(5)}{(1.10\ g)(0.922)} = 5.946\ mg/g \text{ or } mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	2	Pb	5.9	5.9	Y

Note:

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Data Validation Reports
LDC #24047

Wet Chemistry

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 7 through August 9, 2010

LDC Report Date: October 8, 2010

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6223-1

Sample Identification

SSAJ3-02-12BPC
SSAJ3-02-15BPC
SSAJ3-02-8BPC**
SSAJ3-02-8BPC_FD
EB-08072010
SSAI3-04-11BPC
SSAI3-04-14BPC
SSAI3-04-14BPC_FD
SSAI3-02-11BPC
SSAI3-02-14BPC
SSAI3-02-5BPC_FD
SSAI3-03-11BPC
SSAI3-03-14BPC
SSAI3-02-1BPC
SSAI3-02-5BPC
SSAI3-02-8BPC
SSAI3-03-1BPC
SSAI3-03-5BPC**
SSAI3-03-8BPC
SSAI3-04-1BPC
SSAI3-04-5BPC
SSAI3-04-8BPC
SSAI3-03-8BPCMS
SSAI3-03-8BPCMSD
SSAI3-03-8BPCDUP
SSAI3-04-1BPCMS
SSAI3-04-1BPCMSD
SSAI3-04-1BPCDUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 27 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-08072010 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. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6223-1	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 SSAJ3-02-8BPC** and SSAJ3-02-8BPC_FD, samples SSAI3-04-14BPC and SSAI3-04-14BPC_FD, and samples SSAI3-02-5BPC_FD and SSAI3-02-5BPC 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
	SSAJ3-02-8BPC**	SSAJ3-02-8BPC_FD				
Perchlorate	0.085	0.095	11 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-02-5BPC_FD	SSAI3-02-5BPC				
Perchlorate	1.7	1.8	6 (≤50)	-	-	-

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Data Qualification Summary - SDG 280-6223-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6223-1	SSAJ3-02-12BPC SSAJ3-02-15BPC SSAJ3-02-8BPC** SSAJ3-02-8BPC_FD EB-08072010 SSAI3-04-11BPC SSAI3-04-14BPC SSAI3-04-14BPC_FD SSAI3-02-11BPC SSAI3-02-14BPC SSAI3-02-5BPC_FD SSAI3-03-11BPC SSAI3-03-14BPC SSAI3-02-1BPC SSAI3-02-5BPC SSAI3-02-8BPC SSAI3-03-1BPC SSAI3-03-5BPC** SSAI3-03-8BPC SSAI3-04-1BPC SSAI3-04-5BPC SSAI3-04-8BPC	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 280-6223-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-6223-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047B6
SDG #: 280-6223-1
Laboratory: Test America

Date: 10-6-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: W

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-7-10 through 8-9-10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data qmH	SW/A	
IX.	Field duplicates	SW	D=3+4, D=7*+8*, D=11+15
X	Field blanks	ND	EB=5

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	1	SSAJ3-02-12BPC S	11	1	SSAI3-02-5BPC_FD S	21	1	SSAI3-04-5BPC S	31		
2	1	SSAJ3-02-15BPC	12	1	SSAI3-03-11BPC	22	2	SSAI3-04-8BPC	32		
3	1	SSAJ3-02-8BPC **	13	1	SSAI3-03-14BPC qmH	23	1	SSAI3-03-8BPCMS	33		
4	1	SSAJ3-02-8BPC_FD	14	1	SSAI3-02-1BPC	24	1	SSAI3-03-8BPCMSD	34		
5	3	EB-08072010 W	15	1	SSAI3-02-5BPC	25	1	SSAI3-03-8BPCDUP	35		
6	1	SSAI3-04-11BPC S	16	1	SSAI3-02-8BPC	26	1	SSAI3-04-1BPCMS	36		
7	1	SSAI3-04-14BPC	17	1	SSAI3-03-1BPC	27	1	SSAI3-04-1BPCMSD	37		
8	1	SSAI3-04-14BPC_FD	18	1	SSAI3-03-5BPC**	28	1	SSAI3-04-1BPCDUP	38	1	PBS1
9	1	SSAI3-02-11BPC	19	1	SSAI3-03-8BPC	29			39	2	PBS2
10	1	SSAI3-02-14BPC	20	1	SSAI3-04-1BPC	30			40	3	PBW

Notes:

LDC #: 24047B6

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer: W

Method: Inorganics (EPA Method 314.0)

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

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

LDC#: 24047B6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
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)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	3	4				
Perchlorate	0.085	0.095	11			

V:\FIELD DUPLICATES\FD_inorganic\24047B6.wpd

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	11	15				
Perchlorate	1.7	1.8	6			

V:\FIELD DUPLICATES\FD_inorganic\24047B6.wpd

LDC #: 24047B6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

METHOD: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated. Calibration date: 8-10-20

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 ID	Found (units)	True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	ClO4	Blank	-	-	r = 0.999410	r = 0.999165	Y
		Standard 1	1.0 (ug/L)	0.00303			
		Standard 2	2.5 ( )	0.00749			
		Standard 3	5.0 ( )	0.01734			
		Standard 4	10.0 ( )	0.03417			
		Standard 5	20.0 ( )	0.06935			
		Standard 6	40.0 ( )	0.14931			
		Standard 7	-	-			
Calibration verification	ClO4	1436 CCV30	29.624 (ug/L)	30.0 (ug/L)	99	99	
Calibration verification	ClO4	1438 ICV	19.201 (ug/L)	20.0 (ug/L)	96	96	
Calibration verification	-	-	-	-	-	-	-

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

LDC #: 2404786

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method 314.0

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)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
1003 LCS1	Laboratory control sample	ClO_4	0.0948 (mg/kg)	0.100 (mg/kg)	95	95	Y
1806 23	Matrix spike sample	ClO_4	(SSR-SR) 0.1006 (mg/kg)	0.104 (mg/kg)	97	97	↓
1745/1930 25	Duplicate sample	ClO_4	0.0019U (mg/kg)	0.0020U (mg/kg)	0	NC	↓

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 #: 24047B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method 314.0

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 #18, ClO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = mx + b$
where $m = 0.0037$
$b = -0.0010$
$dil = 1x$

Recalculation:
$0.00405 = 0.0037(x\ \mu g/L) - 0.0010$
$1.365\ \mu g/L = x$

then $\frac{(1.365\ \mu g/L)(0.100\ L)}{(10.9\ g)(0.931)} = 0.0135\ \mu g/g$ or mg/kg

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	18	ClO_4	0.014	0.014	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 10, 2010

LDC Report Date: October 15, 2010

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-6345-1/ITH1781

Sample Identification

SSAI3-07-10BPC
SSAI3-07-10BPC_FD
SSAI3-07-1BPC
SSAI3-07-5BPC
SSAJ3-06-1BPC
SSAJ3-06-5BPC
SSAJ3-06-10BPC
SSAJ3-07-SW-E-1BPC**
SSAJ3-05-SW-E-1BPC
SSAJ3-02-SW-E-1BPC
SSAI3-04-SW-E-1BPC
SSAI3-03-SW-E-1BPC
SSAI3-02-SW-E-1BPC_FD
SSAI3-02-SW-E-1BPC
SSAI3-02-SW-W-1BPC
SSAI3-03-SW-W-1BPC
SSAI3-04-SW-W-1BPC
SSAJ3-02-SW-W-1BPC
SSAJ3-05-SW-W-1BPC
SSAJ3-07-SW-W-1BPC**
SSAJ3-07-SW-W-1BPC_FD
SB01-24BPC
SB02-24BPC***
SB01-24BPC_FD
SSAJ3-02-SW-W-1BPCMS
SSAJ3-02-SW-W-1BPCMSD
SSAJ3-02-SW-W-1BPCDUP
SSAJ3-07-SW-W-1BPC_FDMS
SSAJ3-07-SW-W-1BPC_FDMSD
SSAJ3-07-SW-W-1BPC_FDDUP

**Indicates sample underwent Stage 4 review
***Indicates sample underwent Stage 4 review for hexavalent chromium, chlorate only

Introduction

This data review covers 30 soil samples listed on the cover sheet. The analyses were per EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 314.0 for Perchlorate, and SW 846 Method 9056A for Chlorate.

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 contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAJ3-02-SW-W-1BPCMS/MSD (All samples in SDG 280-6345-1/ITH1781)	Perchlorate	136 (75-125)	142 (75-125)	-	J+ (all detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-6345-1/ITH1781	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 SSAI3-07-10BPC and SSAI3-07-10BPC_FD and samples SSAI3-02-SW-E-1BPC_FD and SSAI3-02-SW-E-1BPC and samples SSAJ3-07-SW-W-1BPC** and SSAJ3-07-SW-W-1BPC_FD and samples SB01-24BPC and SB01-24BPC_FD were identified as field duplicates. No contaminant concentrations was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-07-10BPC	SSAI3-07-10BPC_FD				
Perchlorate	0.81	0.78	4 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAI3-02-SW-E-1BPC_FD	SSAI3-02-SW-E-1BPC				
Perchlorate	0.30	0.25	18 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ3-07-SW-W-1BPC**	SSAJ3-07-SW-W-1BPC_FD				
Perchlorate	0.11	0.10	10 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SB01-24BPC	SB01-24BPC_FD				
Perchlorate	250	85	99 (≤50)	-	J (all detects)	A
Chlorate	510	920	57 (≤50)	-	J (all detects)	A

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG 280-6345-1/ITH1781

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-6345-1/ITH1781	SSAI3-07-10BPC SSAI3-07-10BPC_FD SSAI3-07-1BPC SSAI3-07-5BPC SSAJ3-06-1BPC SSAJ3-06-5BPC SSAJ3-06-10BPC SSAJ3-07-SW-E-1BPC** SSAJ3-05-SW-E-1BPC SSAJ3-02-SW-E-1BPC SSAI3-04-SW-E-1BPC SSAI3-03-SW-E-1BPC SSAI3-02-SW-E-1BPC_FD SSAI3-02-SW-E-1BPC SSAI3-02-SW-W-1BPC SSAI3-03-SW-W-1BPC SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD SB01-24BPC SB02-24BPC** SB01-24BPC_FD	Perchlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-6345-1/ITH1781	SSAI3-07-10BPC SSAI3-07-10BPC_FD SSAI3-07-1BPC SSAI3-07-5BPC SSAJ3-06-1BPC SSAJ3-06-5BPC SSAJ3-06-10BPC SSAJ3-07-SW-E-1BPC** SSAJ3-05-SW-E-1BPC SSAJ3-02-SW-E-1BPC SSAI3-04-SW-E-1BPC SSAI3-03-SW-E-1BPC SSAI3-02-SW-E-1BPC_FD SSAI3-02-SW-E-1BPC SSAI3-02-SW-W-1BPC SSAI3-03-SW-W-1BPC SSAI3-04-SW-W-1BPC SSAJ3-02-SW-W-1BPC SSAJ3-05-SW-W-1BPC SSAJ3-07-SW-W-1BPC** SSAJ3-07-SW-W-1BPC_FD SB01-24BPC SB02-24BPC** SB01-24BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
280-6345-1/ITH1781	SB01-24BPC SB01-24BPC_FD	Perchlorate Chlorate	J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-6345-1/ITH1781

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS Additional Sampling, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG 280-6345-1/ITH1781

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 24047E6
SDG #: 280-6345-1/ITH1781
Laboratory: Test America

Date: 10-6-10
Page: 1 of 1
Reviewer: MG
2nd Reviewer: [illegible]

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199), Perchlorate (EPA Method 314.0)
Chlorate (~~EPA~~ SW-846 meth 9056A)

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: 8-10-10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=1+2 D=13+14 D=20+21 D=22+24
X	Field blanks	N	~~EB=EB-08102010 (from 280-6990-1)~~ MH
~~XI~~	~~Surrogate~~		

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

Validated Samples: ** Indicates sample underwent Stage 4 validation
all soil MH

1	SSAI3-07-10BPC	11	SSAI3-04-SW-E-1BPC	21	SSAJ3-07-SW-W-1BPC_FD**	31	
2	SSAI3-07-10BPC_FD	12	SSAI3-03-SW-E-1BPC	22	SB01-24BPC	32	
3	SSAI3-07-1BPC	13	SSAI3-02-SW-E-1BPC_FD	23	SB02-24BPC**	33	
4	SSAI3-07-5BPC	14	SSAI3-02-SW-E-1BPC	24	SB01-24BPC_FD	34	
5	SSAJ3-06-1BPC	15	SSAI3-02-SW-W-1BPC	25	SSAJ3-02-SW-W-1BPCMS	35	
6	SSAJ3-06-5BPC	16	SSAI3-03-SW-W-1BPC	26	SSAJ3-02-SW-W-1BPCMSD	36	
7	SSAJ3-06-10BPC	17	SSAI3-04-SW-W-1BPC	27	SSAJ3-02-SW-W-1BPCDUP	37	
8	SSAJ3-07-SW-E-1BPC**	18	SSAJ3-02-SW-W-1BPC	28	SSAJ3-07-SW-W-1BPC_FDMS	38	
9	SSAJ3-05-SW-E-1BPC	19	SSAJ3-05-SW-W-1BPC	29	SSAJ3-07-SW-W-1BPC_FDMSD	39	PBS1
10	SSAJ3-02-SW-E-1BPC	20	SSAJ3-07-SW-W-1BPC**	30	SSAJ3-07-SW-W-1BPC_FDDUP	40	PBS2

Notes: **, = ~~lost~~ stage 4 for Cr6, chlorate only. MH

LDC #: 24047E6

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method See cover)

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

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

LDC #: 24047E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→21	S	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} [✓ ClO_4] ___ ___
22, 23	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC [✓ CR^{6+}] [✓ ClO_4] [✓ ClO_3] ___
24	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} [✓ ClO_4] [✓ ClO_3] ___
QC 25→30	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} [✓ ClO_4] ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ___ ___
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments: ________________________________

LDC #: 24047E6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method see cover

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
1	25/26	soil	ClO4	136 (75-125)	142 (75-125)	9 (≤20)	~~1-20~~ all	J+ dets /A m

Comments: _____

LDC#: 24047E6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
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)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	1	2				
Perchlorate	0.81	0.78	4			

V:\FIELD DUPLICATES\FD_inorganic\24047E6.wpd

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	13	14				
Perchlorate	0.30	0.25	18			

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Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	20	21				
Perchlorate	0.11	0.10	10			

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Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	22	24				
Perchlorate	250	85	99			J dets/ A fd
Chlorate	510	920	57			J dets/ A fd

V:\FIELD DUPLICATES\FD_inorganic\24047E6.wpd

LDC #: 24047E6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

METHOD: Inorganics, Method see cover

The correlation coefficient (r) for the calibration of ClO3 was recalculated. Calibration date: 8-17-10

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 ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	ClO3	Blank	-	-	r=0.99974	r=0.99932	Y
		Standard 1	0.1 (mg/L)	0.008			
		Standard 2	0.5 (")	0.028			
		Standard 3	1.0 (")	0.055			
		Standard 4	4.0 (")	0.228			
		Standard 5	8.0 (")	0.482			
		Standard 6	10.0 (")	0.606			
		Standard 7	-	-			
Calibration verification	ClO4	1453 ICV	19.7233 (ug/L)	20. (ug/L)	99	99	
Calibration verification	ClO3	0704 CCV	4.8861 (mg/L)	5.00 (mg/L)	98	98	
Calibration verification	Cr VI	1643 CCV	51.9888 (ug/L)	50. (ug/L)	104	not reported	

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 #: 24047E6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
2nd Reviewer: ~

METHOD: Inorganics, Method see cover

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

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
1442 LCS	Laboratory control sample	Cr VI	14.83 (mg/kg)	16.0 (mg/kg)	93	93	Y
1825 25	Matrix spike sample	ClO_4	(SSR-SR) 0.142 (mg/kg)	0.103 (mg/kg)	138	136	↓
1743 / 1804 27	Duplicate sample	ClO_4	0.096 (mg/kg)	0.098 (mg/kg)	2	2	↓

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

LDC #: 24047E6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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 # 23, ClO_3 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = mx + b$

where $m = 0.059$

$b = 0.001$

$d.f. = 500x$

Recalculation:

$0.247 = 0.059\left(\frac{x}{500}\right) + 0.001$

$2084.7\ mg/L = x$

then $\frac{(2084.7\ mg/L)(0.100L)}{(0.0103\ kg)(0.742)} = 27277.4\ mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	8	ClO_4	32	32	Y
2	23	ClO_3	27000	27000	
		Cr VI	140	140	

Note: _____