

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 June 22, 2010

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on June 3, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### LDC Project # 23308:

### <u>SDG #</u>

### **Fraction**

280-2500-2, 280-2500-8, 280-2699-5 280-2771-5, 280-2836-4, 280-2836-6 280-2836-8, 280-2836-9, 280-2879-6 280-2879-7, 280-2879-8, 280-2960-3 280-2960-5, 280-2960-6, 280-2960-7 280-2995-1, 280-2995-2, 280-2995-5 280-2995-6, 280-3059-3, 280-3059-4 280-3059-6, 280-3059-8, 280-3100-1 280-3100-4, 280-3100-6 Semivolatiles, Chlorinated Pesticides Metals, Perchlorate

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

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

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

Sincerely,

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Erlinda T. Rauto Operations Manager/Senior Chemist

	Stage 2B/4				0	# い	23:	308	LDC #23308 (Tronox L	onc	L ×	ا ز	2	ค่	alc,	ЦĢ	Jde	-C-Northgate, Henderson		Ň	2 F	/ Tronox PCS	ă	်း										
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Page:<u>1</u> of 1 Reviewer: <u>JE</u> 2nd Reviewer: BC LDC #: 23308 SDG #: 280-2500-2, 280-2500-8, 280-2699-5, 280-2771-5 280-2836-4, 280-2836-6, 280-2836-8, 280-2836-9 280-2879-6, 280-2879-7, 280-2879-8, 280-2960-3 280-2960-5, 280-2960-6, 280-2960-7, 280-2995-1 280-2995-2, 280-2995-5, 280-2995-6, 280-3059-3 280-3059-4, 280-3059-6, 280-3059-8, 280-3100-1 280-3100-4, 280-3100-6

### 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_LDC23308_062210.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	x			

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23308

Semivolatiles

### LDC

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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 16, 2010

LDC Report Date: June 21, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-2

Sample Identification

EB-04152010-1-RZD

### Introduction

This data review covers 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.

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.

Sample EB-04152010-1-RZD 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

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

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 280-2500-2	All compounds reported below the PQL.	J (all detects)	А

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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2500-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-2	EB-04152010-1-RZD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308A2a SDG #: 280-2500-2

Laboratory: Test America

Stage 2B

Date: 6/4/6 Page: \_\_lof\_] Reviewer: \_\_\_\_\_\_ 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.

			Comments
	Validation Area		Ale le
١.	Technical holding times		Sampling dates: 4/16/10
11.	GC/MS Instrument performance check	A	
	Initial calibration	<u> </u>	2 KSD r CEN KCN 525 2
IV.	Continuing calibration/ICV	A	CEN / CN 525 2
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec US/D
VIII.	Laboratory control samples	A	KS /D
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	·	ND	EB = 1

Note:

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

Validated Samples:

les: Water

					T I
1	EB-04152010-1RZD	11	21	 31	
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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	

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 21, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2699-5

### Sample Identification

SSAK7-01-9BPC SSAK7-01-10BPC

### Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-12911/1-A	4/28/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-2699-5

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
SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	73 ug/Kg	73U ug/Kg
SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2699-5

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2699-5	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2699-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2699-5	SSAK7-01-9BPC SSAK7-01-10BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2699-5

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2699-5	SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	73U ug/Kg	А	bl
280-2699-5	SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2699-5

### No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2699-5

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: 23308C2a SDG #: 280-2699-5

Laboratory: Test America

Date: 6/14 /10 Page: 1 of 1 Reviewer: 344 2nd Reviewer: 4 12.0

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

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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
	Technical holding times	A	Sampling dates: 4/21/16
II.	GC/MS Instrument performance check	A	~ ~ ~
Щ.	Initial calibration	<u> </u>	$\frac{2}{Cav} \frac{ksp}{iav} = \frac{2}{2} \frac{2}{2}$
IV.	Continuing calibration/ICV	A	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	<u>us</u>
IX.	Regional Quality Assurance and Quality Control	<u>N</u>	
<u>x.</u>	Internal standards	A	
XI	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
<b>X</b> 111.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	##b (200 >=// > )
XVII.	Field blanks	SW	FB = FB-04072010- RZD (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: Sril

1	SSAK7-01-9BPC	11	MB 280-12911/1-A	21	31
2	SSAK7-01-10BPC	12		22	32
		13		23	33
3		14		24	34
4		15		25	35
5		16		26	36
6		17		27	37
7		18		28	38
8		19		29	39
9		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. Pentachiorophenol <sup>₩</sup>	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	000. 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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	Ш.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	nuu
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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.

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LDC #: 23308 C29 SDG #: 54 Cm		-	VALIDATIO	N FINDING Blanks	IDATION FINDINGS WORKSHEET <u>Blanks</u>	НЕЕТ			Page: Reviewer:_ 2nd Reviewer:	d Jr
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"Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A"N N/AWas a method blank analyzed for each matrix?V N N/AWas a method blank analyzed for each concentration preparation level?	846 Method all question ink analyzed ink analyzed	8270C) s answered " for each mat for each con	N". Not applic rix? centration pre	able question paration level	is are identifie	d as "N/A".				
Y/N N/A Was a method blank associated with every sample? Y N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 4/28//a Blank analysis date: 4/26/1a Conc. units: 1/2 /a Associated Sample.	ink associate ntaminated? Blank analy	ed with every If yes, please <b>sis date:</b> 4/	y sampre <i>r</i> se see qualification below. L <u>Aastra</u> Associated Samples:	tion below. ed Samples:_		A 1/		$\begin{pmatrix} l \end{pmatrix}$		ſ
	Blank ID					Sample Identification	uo			
	MB 280- 12911	911 X-A		^						
EEF	62.7		13 /u	110 /4						
Blank extraction date:	Blank analysis date:	/sis date:								
Conc. units:			Associa	Associated Samples.						
Compound	Blank ID				St.	Sample Identification	tion			
			-							

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5x Phthalates 2x all others

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Page: 1 of 1 Reviewer: 01																
	14	M									ų					
<b>NORKSHEET</b>		Associated Sample Mentification								Associated Samples:	Sample Identification					
VALIDATION FINDINGS WORKSHEET <u>Field Blanks</u>		ASSOCIE		(ay xs						Associ						
.VALIDA	d 8270C) n this SDG? cted in the field blanks? units: <u>us /t</u> e	insate / Other:	020						units:	Rinsate / Other:						
	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the f いん Associated sample units: <u>い</u>	ne)(Field Blan)/ R	Elank ID		•				Associated sample units:	ne) Field Blank / F						
LDC #: 23 36 & 29 SDG #: 54 Cm~	METHOD:GC/MS BNA (EPA SW 846 Method 8270C)YNN/AVWere field blanks identified in this SDG?VNVN/AWere target compounds detected in the field blank units:MM/LSampling date:4/67/10	Field blank type: (circle one) Field Blank / Rinsate / Other:	Compound	2 E				I CRAL		Sampling date:		Compound				CRAL

5x Phthalates 2x All others

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

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 23, 2010

LDC Report Date: June 16, 2010

Matrix:

Parameters:

**Project/Site Name:** 

Semivolatiles

Soil

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-4

**Sample Identification** 

SSAJ2-01-1BPC

### 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 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 with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-12911/1-A	4/28/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-2836-4

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	Reported	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
SSAJ2-01-1BPC	Bis(2-ethylhexyl)phthalate	89 ug/Kg	89U ug/Kg

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2836-4

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-4	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2836-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2836-4		All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2836-4

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2836-4	SSAJ2-01-1BPC	Bis(2-ethylhexyl)phthalate	89U ug/Kg	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2836-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2836-4

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308E2a

SDG #: <u>280-2836-4</u> Laboratory: <u>Test America</u> Stage 2B

Date: <u>4 / 4 / 10</u> Page: <u>1</u> of <u>/</u> Reviewer: <u>W4</u> 2nd Reviewer: <u></u>

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
<u> </u>	Technical holding times	A	Sampling dates: 4 /23 /10
11.	GC/MS Instrument performance check	<u>A</u>	
ш.	Initial calibration	A	2. RSD NY
IV.	Continuing calibration/ICV	A	Ca/14 = 25 2
V.	Blanks	_SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec. LCS
VIII.	Laboratory control samples	A	los
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	-
XVII.	Field blanks	SW	FB= FB-04672010- RZD (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: Sol

	501				
1	SSAJ2-01-1BPC	11	21	31	
2	MB 280- 12911/-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. Hexachlorobutadiene⁴	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methytphenol	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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	Ш.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	nuu
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyi-phenylether	GGG. Benzo(b)fluoranthene	vw.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	

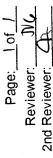
Notes:\* = System performance check compound (SPCC) for RRF; \*\* = Calibration check compound (CCC) for %RSD.

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## 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"

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? γ/N N/A

Was the blank contaminated? If yes, please see gualification below. Ę 30 A/N N/A

Blank extraction date: 4 <u>, 1</u> ð Conc. units:\_

× --Associated Samples:

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Sample Identification										
Sam										
		-	89 /u	_						
		V-V 116								-
Riank ID		V-V 11671-082 9/11	62.7			-				=
2			E EF						1	
	Compound									

Blank analysis date: Blank extraction date:

Associated Samples:

Compound Compound
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5x Phthalates 2x all others

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LDC #:	SDG #:

## VALIDATION FINDINGS WORKSHEET **Field Blanks**

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Page:	Reviewer:	2nd Reviewer:

A 1/	ation					 
Samples:	Sample Identification					
Associated Samples:			GX FB			
Other:		19				
k) Rinsate /		45-04072010- RZD				
∠to e) Field Blan	Blank ID	70-040	N N			
ampling date: <u>4 /•7 /to</u> ield blank type: (circle one) Field Blank) Rinsate / Other	Сотроила		E FFE			CROL

Associated sample units:\_

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Sample Identification Associated Samples: Blank units: Associated sample units: Sampling date: Field Blank / Rinsate / Other: Blank ID Compound CRQL

5x Phthalates 2x All others

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 23, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-6

### Sample Identification

SSAI3-06-3BPC SSAI3-06-4BPC

### Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This gualifier 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 FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2836-6

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-6	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2836-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2836-6		All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2836-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2836-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2836-6

No Sample Data Qualified in this SDG

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VALIDATION	COMPLETENESS	WORKSHEET

Stage 2B

SDG #: 280-2836-6

Laboratory: Test America

LDC #: 23308F2a

Date: 6/14 /10 Page: 1 of ) Reviewer: 46 2nd Reviewer: 46 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	
		A	Sampling dates: 4 /23 /10	
<u> .</u>	Technical holding times GC/MS Instrument performance check	A		
<u> </u>		A	20 RSD rr	
IV.	Continuing calibration/ICV	A	20 RSD rr CQV/IQV £ 25 2	
V.	Blanks	A		
VI.	Surrogate spikes	A		
VII.	Matrix spike/Matrix spike duplicates	N	client Spec	
	Laboratory control samples	A	client spec LCS	
IX.	Regional Quality Assurance and Quality Control	N		
X.	Internal standards	A		
XI.	Target compound identification	N		
XII.	Compound quantitation/CRQLs	N		
XIII.	Tentatively identified compounds (TICs)	Ν		
XIV.	System performance	N		
XV.	Overall assessment of data	A		
		x k		
XVI. XVII.	Field duplicates	WZ	FB = FB-04072010, RZD	(280, 22/6-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

sri

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAI3-06-3BPC	11	21	31
2	SSAI3-06-4BPC	12	22	32
3	MB 280-13178/1-A	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

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 <b>*</b> ∗	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol	KK. 2,4-Dinitrotoiuene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenoi	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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1) <sup>**</sup>	FFF. Di-n-octyiphthalate**	nnn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	wv.
O. 2,4-Dimethylphenol	DD. Ácenaphthylene	SS. Hexachiorobenzene	HHH. Benzo(k)fluoranthene	www.

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

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# VALIDATION FINDINGS WORKSHEET

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### VALIDATION FINDINGS WORKSHEET **Field Blanks**

alle Page: \_\_\_\_\_of \_\_\_ 2nd Reviewer:

Y N N/A Were target compounds detected in the field blanks? Blank units:  $\frac{100}{10}$  /L Associated sample units:  $\frac{100}{10}$  /kg Sampling date:  $\frac{4}{10}$  / $\frac{100}{10}$  Field blank type: (circle one) Field Blank) Rinsate / Other.

4 Associated Samples:

palicamo	Blank ID				Se	Sample Identification	tion		
	FR-04673	FB-046726In- RZD							
EEE	4.8		5 <	5x FB)					

Associated sample units:\_

Blank units: Sampling date:

Sampring uate	e) Field Blank	Rinsate / Other.</th <th>Associated Samples:</th> <th></th>	Associated Samples:	
	Rlank ID		Sample identification	
CKUL				

5x Phthalates 2x All others

FBLKASC2tronox.wpd

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 23, 2010

Soil

LDC Report Date: June 16, 2010

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-8

### Sample Identification

SSAI3-05-8BPC SSAI3-05-10BPC

### Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2836-8

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-8	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2836-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2836-8	SSAI3-05-8BPC SSAI3-05-10BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2836-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2836-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2836-8

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>280-2836-8</u>

LDC #:\_\_\_

23308G2a

Laboratory: Test America

Date:_	\$ /14 /10
Page:_	_lof
Reviewer:	JVC
2nd Reviewer:	9.

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
	Technical holding times	A	Sampling dates: 4 /23 /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD IT Car/icr E252
IV.	Continuing calibration/ICV	A	Car/10 2252
V.	Blanks	A	
VI.	Surrogate spikes	<u> </u>	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec VS
VIII.	Laboratory control samples	<u> </u>	23
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	+B = FB-04072010- RZD (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

		11	21	31	
1	SSAI3-05-8BPC	11		00	
2	SSAI3-05-10BPC	12	22	32	
3	MB 280- 13949 /21-A	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. Phenoit	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	ŤΤ. Pentachlorophenol <sup>™</sup>	III. Banzo(a)pyrane⊷
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-Trichiorobenzene	GG. Acenaphthenet	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 <sup>44</sup>	T. 4-Chioroaniline	ll. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Anlline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2"-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	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-Trichiorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniiine	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**	nuu
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
0. 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.

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### VALIDATION FINDINGS WORKSHEET **Field Blanks**



					ND or		
	e tield blanks?	ther:					
AS BNA (EPA SW 846 Method 82/0C) Were field blanks identified in this SDG?	letected in the	// Rinsate / O		FB-04672610- RZD			
A SW 846 M6 lanks identifie	compounds c ociated samp	e) field Blank	Blank ID	FB-04672	2.2		
<b>METHOD:</b> GC/MS BNA (EPA SW 846 Method 82/0C) Y N N/A Were field blanks identified in this SDG	<u>VN N/A</u> Were target compounds detected in the field blanks? Blank units: <sup>by</sup> / Associated sample units: <u>by</u> /Cy	Sampling date: $\frac{4}{\sqrt{5}}$ //3 Field blank type: (circle one) field Blank / Rinsate / Other.	Compound		EFE		

¥ :/ Associated Samples:

Sample Identification		hD x > 5x Fb >			
	FB-04672hin- RZD				
Blank ID	FB-04672	EEE 2.2			
Company		EFE			crol

Associated sample units:

Blank units:\_\_\_\_\_ Sampling date:\_\_\_

Field blank type: (circle one) Field Blank / Rinsate / Other: Compound Blank ID Blank III Blank IIII Blank III Blank IIII Blank III Blank III Blank IIII Blank IIIII Blank IIIII Blank IIIIII Blank IIII Blank IIIII	Field Blank / Rinsate / Other:	Associated Samples: Sample Identification

5x Phthalates 2x All others

FBLKASC2tronox.wpd

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 26, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-6

### Sample Identification

SSAJ2-02-3BPC SSAJ2-02-4BPC SSAJ2-02-5BPC

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### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2879-6

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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	Criteria	Flag	A or P
SSAJ2-02-3BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene		Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2879-6	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2879-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2879-6	SSAJ2-02-3BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-2879-6	SSAJ2-02-3BPC SSAJ2-02-4BPC SSAJ2-02-5BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2879-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2879-6

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308l2a

SDG #: 280-2879-6

Laboratory: Test America

Stage 2B

Date:	6/12/m
Page:	l_of_/
Reviewer:	JY6
2nd Reviewer:	$\checkmark$

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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: 4/26 /10
11.	GC/MS Instrument performance check	A	
Ш.	Initial calibration	A	2 RSD IT
IV.	Continuing calibration/ICV	4	Cav/1W = 252
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	<u>N</u>	Client Spec
VIII.	Laboratory control samples	A	231
IX.	Regional Quality Assurance and Quality Control	N	
Х.	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	SN	F\$ = FB-0407 2010-RZD (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:

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1	SSAJ2-02-3BPC	11	MB 280- 13949 61-A21	31	
2	SSAJ2-02-4BPC	12	/ 22	32	
3	SSAJ2-02-5BPC	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. Phenoi⁺	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachiorophenol	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	FF, 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthane™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)peryiene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenoi*	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	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
l. 4-Methyiphenol	X. Hexachiorocyclopentadiene*	MM. 4-Chiorophenyl-phenyl ether	BBB. 3,3'-Dichiorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octyiphthalate	nn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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.

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### VALIDATION FINDINGS WORKSHEET **Field Blanks**

	J/C	d
Page:	Reviewer:	2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)	Were field blanks identified in this SDG?	Were target compounds detected in the field blanks?	s: 49 /L Associated sample units: 46 / 49	Sampling date: 4 /07/10
METHOD: GC	X N N/A	Y N N/A	<ul> <li>Blank units:</li> </ul>	Sampling da

(	/ en						
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	Associated Samples:	Sample Identification					
	Associated				 	 	
,	Other:		]				
(	<u>k// Rinsate / (</u>		FB-0407206. RZD				
( (	e) fíeld Blan	Blank ID	Fb-0407	2.2			
3: 4 /07,	pe: (circle on	ound		<del>111</del>			
Sampling date: 4 /07//0	Field blank type: (circle one) field Blank/ Rinsate / Other:	Compound					CRQL

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

Field blank type: (circle one) Field Blank / Rinsate / Other:	e) Field Blank	< / Rinsate / Other:	Associated Samples:	amples:		
Compound	Blank ID		Š	Sample Identification		
CRAL						

5x Phthalates 2x All others

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•   #	# #
БС	SDG

## **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 9 Reviewer: 2nd Reviewer:

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

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? Y N N/A

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	(4)	<u> </u>													
Qualifications	J/WJ /P														
Accoriated Samples															
Acco															
	uncesohad														
1	rinding La La La														alculations
	229														sheet for rec:
															Comments: See semple retruitation verification worksheet for recalculations
	Sample ID														ulation verif
	-												 	 	samola calc
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	*														

COMQUA.2S

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 27, 2010

Soil

LDC Report Date: June 16, 2010

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-3

**Sample Identification** 

SSAR7-02-1BPC

### 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 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 gualifier 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 FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples		
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2960-3		

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P	
All samples in SDG 280-2960-3	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2960-3

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2960-3	SSAR7-02-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2960-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2960-3

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308L2a

SDG #: <u>280-2960-3</u> Laboratory: <u>Test America</u> Stage 2B

Date: <u>6 /14 //</u>• Page: <u>1</u> of <u>)</u> Reviewer: <u>J (</u> 2nd Reviewer: <u>9</u>

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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
1.	Technical holding times	A	Sampling dates: 4/27 /4
11.	GC/MS Instrument performance check	A	,
	Initial calibration	A	2 KSD r
IV.	Continuing calibration/ICV	A	Car/101 = 25 2
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	client spec us
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB 04 06 2010 - RZB (280 - 2131 - 2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAR7-02-1BPC	11	21	31
2 -	MB 280- 13357/1-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. Phenoi⁺	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoiuene	TT. Pentachlorophenol	III. Benzo(a)pyrane™
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF, 3-Nitroaniiine	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene <b>r</b>	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	ll. 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	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
l. 4-Methyiphenoi	X. Hexachiorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Díchlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 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**	nn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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.

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### VALIDATION FINDINGS WORKSHEET **Field Blanks**

2nd Reviewer: 4. Wh Page: 1 of 1

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)Y N N/AWere field blanks identified in this SDG?Y N N/AWere target compounds detected in the field blanks?Blank units: 40 / LAssociated sample units: 40 / LSampling date:4 / 0 LField blank type: (circle one) Field Blank/ Rinsate / Other:
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Sample Identification					
		$\cap$			
		P5X FB			
	F& 044200- R2B				
Blank ID	F\$ 04%.	2,7			
Compound		HEE.			CRAL
					Ö

Associated sample units: Blank units:\_

Sample Identification Associated Samples: Blank ID Compound CRQL

5x Phthalates 2x All others

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

Soil

Semivolatiles

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 27, 2010

LDC Report Date: June 16, 2010

Matrix:

Parameters:

**Project/Site Name:** 

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-5

Sample Identification

SSAK8-05-1BPC

### 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 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.

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Sampling Field Blank ID Date		Compound	Concentration	Associated Samples	
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2960-5	

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample Finding		Flag	A or P
All samples in SDG 280-2960-5	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2960-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2960-5	SSAK8-05-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2960-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2960-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson								
VALIDATION	COMPLETE	NESS WORK	SHEET					

Stage 2B

SDG #: <u>280-2960-5</u> Laboratory: <u>Test America</u>

23308M2a

LDC #:

### Date: <u>6 /14 /10</u> Page: <u>1 of /</u> Reviewer: <u>**3**V4</u> 2nd Reviewer: <u>4</u>

### 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
1.	Technical holding times	A	Sampling dates: $4/27/t_0$
.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	B RSD IT
IV.	Continuing calibration/ICV	A	2 RSD IT CW/IW = 25 D
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	Client Snec
VIII.	Laboratory control samples	A	Client Spec LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB-04072010-RZD (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:

vanue					
1	SSAK8-05-1BPC	11	21	31	
2	MB 280 - 13949 /21+	: 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. Phenoit	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-Chiorophenoi	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene"	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenžene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroanlline	II. 4-Nitrophenoi"	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene <b>*</b> *	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Anlline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenoi	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methyinaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyi-phenyi ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyi 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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroanliine	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	w.
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.

COMPNDL

LDC #: 23308 M29 SDG #: Ea Carr			VALIDAT	ION FINDI Field B	VALIDATION FINDINGS WORKSHEET Field Blanks	KSHEET			Page: Reviewer:	Page: 1 of 1
METHOD:GC/MS BNA (EPA SW 846 Method 8270C)YNN/AWere field blanks identified in this SDG'YN/AWere target compounds detected in theSIank units:45.00Associated sample units: 40	A SW 846 Mi lanks identifie compounds c ociated sam	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the field blanks? <u>15 / L</u> Associated sample units: <u>45</u> / <del>b</del>	i? e field blanks / 특성	2					zna Kevlewer.	wei:
Sampling date: 7 / 77 / 10 Field blank type: (circle one) Field Blank / Rinsate / Other:	() Field Blank	/ Rinsate / O	<u> </u>		Associated Samples:	amples:	41	(ND)	4	
Compound	Blank ID				Š	Sample Identification	tion	/		
	-0102700-87	10- RZD								
EFE	2, イ									
CRQL										
unite.	Associated sample units:	nle units:								
ite:										
Field blank type: (circle one) Field Blank / Rinsate / Other:	e) Field Blank	<pre><!-- Rinsate / O</pre--></pre>	ther:		Associated Samples:	amples:				
Compound	Blank ID				Ű	Sample Identification	tion			

5x Phthalates 2x All others

CRQL

FBLKASC2tronox.wpd



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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 27, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-6

### Sample Identification

SSAK8-04-4BPC SSAK8-04-5BPC\*\* SSAK8-04-5BPC FD

\*\*Indicates sample underwent Stage 4 review

### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 gualifier 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 FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/07/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280- 2960-6

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

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

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2960-6	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 SSAK8-04-5BPC\*\* and SSAK8-04-5BPC\_FD were identified as field duplicates. No semivolatiles were detected in any of the samples.

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2960-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2960-6	SSAK8-04-4BPC SSAK8-04-5BPC** SSAK8-04-5BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2960-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2960-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2960-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

SDG #: 280-2960-6 Laboratory: Test America

LDC #: 23308N2a

Date: 6/15 /w Page: 1 of ) Reviewer: 1/6 2nd Reviewer: 0

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
L	Technical holding times	A	Sampling dates: 4 /27 /2
   .	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	A	CON/LON ERSZ
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec.
VIII.	Laboratory control samples	A	231
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
X1.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	ND	D = 2,3
XVII.	Field blanks	SN	F\$ = FB-04672010- RZD (280-2216-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples: **\* \* Stage 4** 

<del> </del>   1	SSAK8-04-4BPC	11	MB 280 - 13949 b1-A	21	31
2	SSAK8-04-5BPC **	<b>D</b> 12	/	22	32
3	SSAK8-04-5BPC_FD	<b>b</b> 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

### LDC #: 77.368 N22 SDG #: See Cover

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### VALIDATION FINDINGS CHECKLIST

### Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times				
All technical holding times were met.	$\checkmark$			
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?				
IIIF Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	$\leq$	<u> </u>		
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?		Ĺ		
Were all percent differences (%D) $\leq$ 25% and relative response factors (RRF) $\geq$ 0.05?		ł		
V. Blanks				
Was a method blank associated with every sample in this SDG?	/	ļ		
Was a method blank analyzed for each matrix and concentration?		]	ļ	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/	ł	
VI. Surrogate spikes				
Were all surrogate %R within QC limits?		1		
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			1 1	
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?	ļ		ł	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			-	
VIII. Laboratory control samples				nge in pursen and an a state of the second state of
Was an LCS analyzed for this SDG?	1/	1		

### VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	$\langle$			
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?	$\square$			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	$\square$			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	$\square$			
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).				Mangaran ann ann ann ann ann ann ann
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?				-
Were relative intensities of the major ions within $\pm$ 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)?		1		
XIV. System performance				
System performance was found to be acceptable.				
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	1	Ĺ		
XVI: Field duplicates			1	
Field duplicate pairs were identified in this SDG.		ſ		
Target compounds were detected in the field duplicates.	1			
XVII. Field blanks	20 <b>6</b> 02			
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. Pentachiorophenol	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	FF, 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chiorophenol	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-Chloroanliine	ll. 4-Nitrophenoi*	XX. Di-n-butylphthalate	MMM. Bis(2-Chiorolsopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methyiphenoi	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butyibenzyiphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohoi
J. N-Nitroso-di-n-propylamine⁴	Y. 2,4,6-Trichlorophenol	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichiorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	nuu
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	wv.
O. 2,4-Dimethyiphenoi	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

COMPNDL

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### VALIDATION FINDINGS WORKSHEET **Field Blanks**

- of -	NG	커
Page:	Reviewer:	2nd Reviewer:_

AMETHOD: GC/MS BNA (EPA SW 846 Method 8270C)	Were field blanks identified in this SDG?	Were target compounds detected in the field blanks?	いの /L Associated sample units: いの Associated sample unit	Sampling date: 4 / 07 / 0	Eiold blank truns. (circle one Eiold Blank) Bineste / Other
AMETHOD: GC/	Y N N/A		Blank units:	Sampling date	Eicld block tw

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( QN						
4 <i>\</i> / (	ation			 		
	Sample Identification					
Associated Samples:						
Other:						
k/ Rinsate / (		010- 22D		 		
e) Field Blan	Blank ID	FB-64072010- 22D	2,2			
Field blank type: (circle one) Field Blank? Rinsate / Other	Compound		EEE			
Field blan	C					CROL

Associated sample units:

Blank units:\_\_\_\_ Sampling date:\_\_ Field blank tyne'

ata / Other nt / Din /-i-alo anol Eigld Bl

Field blank type: (circle one) Field Blank / Rinsate / Other:	e) Field Blank	: / Rinsate / Other:	Associated Samples:	amples:		
Compound	Blank ID		S	Sample Identification	uo	
CRQL						

5x Phthalates 2x All others

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LDC#: ~3308 Nrg SDG#: 20 CD

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1 Reviewer: 104 2nd Reviewer: 01

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<sub>x</sub>)(C<sub>is</sub>)/(A<sub>is</sub>)(C<sub>x</sub>) 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,

 $A_{\rm is} = A_{\rm is} = A_{\rm is}$  and associated internal standard  $C_{\rm is} = Concentration of internal standard X = Mean of the RRFs$ 

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID	Date	Compound (Internal Standard)	( 50 std)	( 50 std)	(Initial)	(Initial)		
-	ICAL	5/4/2010	5/4/2010 1,4-Dioxane (IS1)	0.6700	0.6700	0.6718	0.6718	4.8	4.84
	MSS Y	•	Naphthalene (IS2)	1.0419	1.0419	0.9990	0.9990	8.0	8.04
			Fluorene (IS3)	1.3468	1.3468	1.3058	1.3058	8.0	8.02
			Hexachlorobenzene (IS4)	0.1996	0.1996	0.1947	0.1946	2.8	2.82
			Chrysene (IS5)	1.0651	1.0651	1.0509	1.0509	7.9	7.92
			Benzo(a)pyrene (IS6)	1.1462	1.1462	1.1042	1.1042	3.3	3.28

Area IS	347342	1363095	780352	1343097	1401828	1263104
Area cpd	290884	1775212	1313767	335135	1866391	1809781
onc IS/Cpd	40/50	40/50	40/50	40/50	40/50	40/50

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00		1.1191	1.4337		1.1603	1.0624
10.00	0.7200	1.0315	1.4006	0.1914	1.1208	1.0548
20.00	0.7128	1.0652	1.3863	0.1995	1.1246	1.1138
50.00	0.6700	1.0419	1.3468	0.1996	1.0651	1.1462
80.00	0.6540	0.9915	1.2886	0.2021	1.0538	1.1452
120.00	0.6579	0.9413	1.2601	0.1897	0.9907	1.1311
60.00	0.6321	0.9206	1.1894	0.1905	0.9596	1.1027
200.00	0.6558	0.8811	1.1406	0.1897	0.9324	1.0775
= ×	0.6718	0666.0	1.3058	0.1946	1.0509	1.1042
s "	0.0325	0.0803	0.1047	0.0055	0.0832	0.0362

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.

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LDC # 33 30 N 29 SDG # <u>See Cover</u>

## VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

<u>A</u> Page \_\_\_\_ of \_\_\_ Reviewer:\_ 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:

Where:

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

ave. RRF = initial calibration average RRF RRF = continuing calibration RRF

Ax = Area of compound Ais = Area of associated internal standard

AX = Area of compound CX = Concentration of compound Cis = Concentration of internal standard

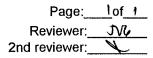
	Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	۵%
Y2041	05/05/10	1,4-Dioxane (IS1)	0.6718	0.6326	0.6326	5.8	5.8
		Naphthalene (IS2)	0666.0	0.9901	0.9901	0.9	0.9
		Fluorene (IS3)	1.3058	1.2805	1.2805	1.9	1.9
		Hexachlorobenzene (IS4)	0.1947	0.1995	0.1995	2.5	2.5
		Chrysene (IS5)	1.0509	1.0427	1.0427	0.8	0.8
		Benzo(a)pyrene (IS6)	1.1042	1.1500	1.1500	4.1	4.1
╞							

Compound (Reference IS)		Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(ISI)	40/80	529970	418891
Naphthalene	(IS2)	40/80	3249540	1640967
Fluorene	(IS3)	40/80	2525517	986110
Hexachlorobenzene	(IS4)	40/80	667483	1672491
Chrysene	(IS5)	40/80	3658447	1754242
Benzo(a)pyrene	(IS6)	40/80	3746932	1629142

LDC #: 33308 N29

SDG #: Sre Cover

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification



### 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

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	75.7	76	76	6
2-Fluorobiphenyl		77.3	77	77	
Terphenyl-d14	1	88.8	89	89	
Phenol-d5	150	120. 975	8)	8'/	
2-Fluorophenol		117.6	78	78	
2,4,6-Tribromophenol		118.5	79	79	K
2-Chlorophenol-d4	1		/		
1,2-Dichlorobenzene-d4					

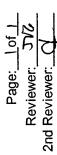
### Sample ID:\_\_\_\_\_

	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					

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23308	Core
2	e
#	: #: Sce
LDC	SDG



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: UCS 280 - 13949 /22-A

	S	ike	Sc	ike	<b>J</b>	LCS		csD	1 CS/I	I CS/I CSD
Compound		Added ( VG /bc)	Conce ( v	Concentration ( いら /ち)	Percent Recovery	čecovery	Percent Recovery	lecovery	RPD	Q
	- CS	U I CSD			Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
N-Nitroso-dí-n-propylamine										
4-Chloro-3-methylnhenol								1		
Acenaphthene	25%	A	170	Å	4	er L				
Pentachiorophenol										
Pyrene	arse	~	1 8 70	<u></u>	74	<u>x</u>				

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 #: 23308 N29

SDG #: Sre Cover

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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V

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

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

				Bana	unte al		culated			
2.0	=	Factor of 2 to account for GPC cleanup								
%S	=	Percent solids, applicable to soil and solid matrices only.								
Df	=	Dilution Factor.								
V <sub>t</sub>	=	Volume of the concentrated extract in microliters (ul)								
V,		Volume of extract injected in microliters (ul)	=							
V <sub>o</sub>	=	Volume or weight of sample extract in milliliters (ml) or grams (g).								
l,	=	Amount of internal standard added in nanograms (ng)	Conc. = <u>(</u> (	<u>)(</u>	)()(	)(	)()(	)(	)	
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard								
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D.	·· ·	N	ν				
Conce	entratio	$n = (A,)(I_{s})(V,)(DF)(2.0) (A_{is})(RRF)(V_{s})(V_{s})(%S)$	Example:		1	۴.				
			1							

		Compound	Reported Concentration	Calculated Concentration	Qualification
#	Sample ID	Compound			
			······		
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╟					

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

June 16, 2010

Soil

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date:

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-1

### Sample Identification

RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC SSAO6-04-3BPC\*\* SSAO6-04-1BPC RSAQ3-2BPCMS RSAQ3-2BPCMSD

\*\*Indicates sample underwent Stage 4 review

### Introduction

This data review covers 10 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 EB04282010-RZB (from SDG 280-2995-2) was identified as an equipment blank. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB04282010-RZB	4/06/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC

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

Samples FB04062010-RZB (from SDG 280-2131-2) and FB-04072010-RZC (from SDG 280-2280-2) were identified as field blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04062010-RZB	4/06/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC

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

### VI. Surrogate Spikes

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

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAO6-04-1BPC	Phenol-d5 2-Fluorophenol Nitrobenzene-d5 Terphenyl-d14	38 (52-120) 37 (53-120) 40 (50-120) 44 (55-120)	All TCL compounds	J- (all detects) UJ (all non-detects)	Ρ

### 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	Criteria	Flag	A or P
RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC	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.	Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-1	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2995-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2995-1	SSAO6-04-1BPC	All TCL compounds	J- (all detects) UJ (all non-detects)	Ρ	Surrogate spikes (%R) (s)
280-2995-1	RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-2995-1	RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC SSA06-04-3BPC** SSA06-04-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2995-1

### No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B / 4

Date:	6/15
Page:	l of
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2nd Reviewer:	Q

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SDG #:\_ 280-2995-1 Laboratory: Test America

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LDC #:\_

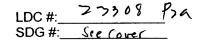
### METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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

<b></b>	Validation Area		Comments
<u> </u>	Technical holding times	A	Sampling dates: 4 /28 /10
11.	GC/MS Instrument performance check	Â	
111.	Initial calibration	A	2 RSD IV
IV.	Continuing calibration/ICV	A	car/101 = 252
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	
Х.	Internal standards	A	
XI.	Target compound identification	мА	
XII.	Compound quantitation/CRQLs	SM	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	NA	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB 04 06 2010 - KZB ( 280 - 2131 - 2)
Note:	N = Not provided/applicable R = Rin		EB = Equipment blank

Valida	ated Samples: * Stage 4	Soj
1	RSAQ3-1BPC	

1	RSAQ3-1BPC	11	MB 280 - 13357/1-A	21	31	
2	RSAQ3-2BPC	12	/	22	 32	
3	SA169-1BPC	13		23	 33	
4	SA169-2BPC	14		24	34	
5	SA110-1BPC	15		25	 35	
6	SA110-2BPC	16		26	36	
7	SSA06-04-3BPC **	17		27	37	
8	SSAO6-04-1BPC	18		28	38	
9	RSAQ3-2BPCMS	19		29	 39	
10	RSAQ3-2BPCMSD	20		30	40	



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### Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	$\leq$			
Cooler temperature criteria was met.	Ĺ			
II. GC/MS Instrument performance check	1 1			
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	1	l		
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		1-10 P		
Was a method blank associated with every sample in this SDG?	$\leq$			
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.		/	ľ	
VII. Surrogate spikes				
Were all surrogate %R within QC limits?		/	1	
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?	/			

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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			r T	
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				a fe the support of the
X. Internal standards	- 492-51 T		icalia I	
Were internal standard area counts within -50% or +100% of the associated calibration standard?		ļ		
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification	T 7			
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	$\square$	ļ		
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	$\leq$	<b>_</b>		
Were chromatogram peaks verified and accounted for?		Ł		
XII. Compound quantitation/CRQLs	1	<u> </u>	<u></u>	
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?		1		
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 $\pm$ 20% between the sample and the reference spectra?	,		ļ.	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/	Ł	
XIV. System performance	94. 194			
System performance was found to be acceptable.		1	Ι	
the second s				
XV Overall assessment of data	T	オー	T	
Overall assessment of data was found to be acceptable.				
XVI. Field ouplicates				
Field duplicate pairs were identified in this SDG.		1-	1	
Target compounds were detected in the field duplicates.				ť
XVII. Field blanks				
Field blanks were identified in this SDG.	/	$\Box$		
Target compounds were detected in the field blanks.		1		

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

MMM. Bis(2-Chloroisopropyl)ether 000. N-Nitrosodimethylamine KKK. Dibenz(a,h)anthracene JJJ. Indeno(1,2,3-cd)pyrene LLL. Benzo(g,h,i)perylene QQQ. Benzyl alcohol III. Benzo(a)pyrene\*\* PPP. Benzoic Acid SSS. Benzidine RRR. Pyridine NNN. Aniline www. Ē nnn Š EEE. Bis(2-ethylhexyl)phthalate GGG. Benzo(b)fluoranthene BBB. 3,3'-Dichlorobenzidine HHH. Benzo(k)fluoranthene AAA. Butylbenzyiphthalate CCC. Benzo(a)anthracene FFF. Di-n-octylphthalate\*\* TT. Pentachlorophenol\*\* XX. Di-n-butylphthalate YY. Fluoranthene\*\* UU. Phenanthrene DDD. Chrysene W. Anthracene WW. Carbazole ZZ. Pyrene QQ. N-Nitrosodiphenylamine (1)\*\* MM. 4-Chlorophenyl-phenyl ether RR. 4-Bromophenyl-phenylether PP. 4,6-Dinitro-2-methylphenol SS. Hexachlorobenzene KK. 2,4-Dinitrotoluene HH. 2,4-Dinitrophenol\* EE. 2,6-Dinitrotoluene LL. Diethylphthalate GG. Acenaphthene\*\* 00. 4-Nitroaniline JJ. Dibenzofuran FF. 3-Nitroaniline II. 4-Nitrophenol\* NN. Fluorene X. Hexachlorocyclopentadiene\* P. Bis(2-chloroethoxy)methane V. 4-Chloro-3-methylphenol\*\* U. Hexachlorobutadiene\*\* Y. 2,4,6-Trichlorophenol\*\* R. 1,2,4-Trichlorobenzene AA. 2-Chloronaphthalene W. 2-Methylnaphthalene Z. 2,4,5-Trichlorophenol CC. Dimethylphthalate Q. 2,4-Dichlorophenol\*\* DD. Acenaphthylene BB. 2-Nitroaniline T. 4-Chloroaniline S. Naphthalene H. 2,2'-Oxybis(1-chloropropane) J. N-Nitroso-di-n-propylamine\* B. Bis (2-chloroethyl) ether E. 1,4-Dichlorobenzene\*\* D. 1,3-Dichlorobenzene F. 1,2-Dichlorobenzene O. 2,4-Dimethylphenol K. Hexachloroethane G. 2-Methylphenol N. 2-Nitrophenol\*\* C. 2-Chlorophenol I. 4-Methylphenol L. Nitrobenzene M. Isophorone A. Phenol\*\*

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

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## VALIDATION FINDINGS WORKSHEET

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## VALIDATION FINDINGS WORKSHEET Field Blanks

8t Page: 1 of 1 Reviewer:

₩ĘTHOD: GC/MS BNA (EPA SW 846 Method 8270C)	Manage Relation Monthly in this CDC?
GC/MS BNA	- 2
RETHOD:	· · · · · · · · · · · · · · · · · · ·

METHOD: GC/MS BNA (EPA SW 846 Method 82/0C)         Y N N/A       Were field blanks identified in this SDG?         V N N/A       Were target compounds detected in the field blanks?         Blank units:       W	١.
METHOD: G( Y N N/A V N N/A Blank units:	-

	ate / Other:
a/ 28/10	Field blank type: (circle one) Field Blank/ Rinsate / O
6 10 j	te one) (Field
date: 4 /c	k type: (circ
Sampling date:	Field blank

و ر Associated Samples:

Icid biding the long of a long									
	(4/%) Blank ID	(4/28)		S	Sample Identification	tion			
Compound									
	18	50						-	
	2.7	2.2	l'eitre	either ND or > 5× Fb/EB	x 5 x	FB/EB)			
2 1 A	+								
							<u> </u>		
FR = FB 04062010- RZR	ID-RZR								
EB = EDATO TO TA RZA	RZB								
1 0/ 20/ 0									
				-					

Associated sample units:\_

Blank units:\_\_\_\_\_ Sampling date:\_

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Field blank type: (circle one) Field Blank / Rinsate / Other:	) Field Blank	k / Rinsate / Other: Associated Samples:	
Compound	Blank ID	Sample Identification	
CRUL			

5x Phthalates 2x All others

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LDC #:	SDG #:

### VALIDATION FINDINGS WORKSHEET Surrogate Recovery

Reviewer: لی۔ ا Page: 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? If 2 or more have notified or notification or notification of the set of the s

Were percent recoveries (%R) for surrogates within QC limits? If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

		(J)																								
	ıtions	(au ta)	×   																							
	Qualifications	J-/4J/P																								QC Limits (Water) 21-100 10-123 33-110* 16-110*
	its)	( 02/ -25)	( 23- [20)	( 20-120)	( 22 / 20 )	) (	) (	(	( )	(	(	(	( )	) (	( )	) (	( )	(	)	(	( )	( )	(	( )	)	<u>OC Limits (Soil)</u> 25-121 19-122 20-130*
o confirm %R?	%R (Limits)	38	37	40	44																					S5 (2FP)= 2-Fluorophenol S6 (TBP) = 2,4,6-Tribromophenol S7 (2CP) = 2-Chlorophenol-d4 S8 (DCB) = 1,2-Dichlorobenzene-d4
analysis performed to confirm %R?	Surrogate	DHT 1Hd	ZFP	NBZ	HdL																					S5 (2FP)= 2-F S6 (TBP) = 2, S7 (2CP) = 2, S8 (DCB) = 1,
If any %R was less than 10 percent, was a reanaly	٩																									<u>OC Limits (W ater)</u> 35-114 43-116 33-141 10-94
If any %R was less than	Sample ID	8 (5×	ľ.																							OC Limits (Soil) 23-120 1 30-115 18-137 24-113
	Date		· · · · · · · · · · · · · · · · · · ·																							* QC limits are advisory S1 (NBZ) = Nitrobenzene-d5 S2 (FBP) = 2-Fluorobipheny S3 (TPH) = Terphenyl-d14 S4 (PHL) = Phenol-d5
K N (I/A)	#																									* QC   S1 (NE S2 (FB S3 (TP S3 (TP

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LDC #: 23 308 P24 Jer! SDG #: C

## **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET

×) ) of Page: Reviewer: 2nd Reviewer:

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

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

 Y N N/A
 Were 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?

Qualifications	J/45/P (g)									
Associated Samples										
Finding	699, HHH where the	<i>L</i> .								
Sample ID	123456									
Date										
*										

Comments: See sample calculation verification worksheet for recalculations

LDC #: ~~>> 0 & P2A SDG #: \_\_\_\_\_\_

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Eg' Page: 1 of 1 Reviewer: 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<sub>x</sub>)(C<sub>is</sub>)/(A<sub>is</sub>)(C<sub>x</sub>) 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,

 $A_{\rm is}$  = Area of associated internal standard  $C_{\rm is}$  = Concentration of internal standard

X = Mean of the RRFs

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID Date	Date	Compound (Internal Standard)	( 50 std)	( 50 std)	(Initial)	(Initial)		
-	ICAL	4/20/2010	4/20/2010 1,4-Dioxane (IS1)	0.6731	0.6731	0.6818	0.6818	5.4	5.44
	MSS D		Naphthalene (IS2)	1.1079	1.1079	1.1204	1.1204	4.7	4.70
			Fluorene (IS3)	1.3779	1.3779	1.3629	1.3629	8.9	8.89
			Hexachlorobenzene (IS4)	0.2590	0.2590	0.2705	0.2705	14.0	13.97
			Chrysene (IS5)	1.0611	1.0611	1.0324	1.0324	4.3	4.35
			Benzo(a)pyrene (IS6)	1.1960	1.1960	1.1835	1.1835	13.5	13.49

	<u>و</u>	5	Q	4	N	90
Area IS	262046	997667	671030	1219394	1513952	1309806
Area cpd	220464	1381644	1155733	394826	2008107	1958223
Inc IS/Cpd	40/50	40/50	40/50	40/50	40/50	40/50

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.6984	1.0908	1.2935		1.0330	0.9394
10.00	0.7499	1.0730	1.1667	0.2303	0.9982	1.0100
20.00	0.6512	1.0585	1.2453	0.2289	1.0104	1.0839
50.00	0.6731	1.1079	1.3779	0.2590	1.0611	1.1960
80.00	0.6228	1.1000	1.3843	0.2562	1.0602	1.2099
120.00	0.6766	1.1473	1.4242	0.2854	1.0752	1.3098
60.00	0.6887	1.1741	1.4888	0.3029	1.0741	1.3626
200.00	0.6937	1.2114	1.5224	0.3306	0.9470	1.3565
= ×	0.6818	1.1204	1.3629	0.2705	1.0324	1.1835
s 1	0.0371	0.0527	0.1212	0.0378	0.0449	0.1597

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.

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LDC # 23 70 8 224 SDG # See Cover

## **Continuing Calibration Results Verification** VALIDATION FINDINGS WORSHEET

Page 1 of ) Reviewer: 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:

Where:

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

ave. RRF = initial calibration average RRF RRF = continuing calibration RRF

Ais = Area of associated internal standard Ax = Area of compound

Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration			Average RRF	Reported	Recaiculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	erence IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	%D
-	D4531	05/01/10	1,4-Dioxane	(IS1)	0.6818	0.6135	0.6135	10.0	10.0
			Naphthalene	(IS2)	1.1204	1.1479	1.1479	2.5	2.5
			Fluorene	(IS3)	1.3629	1.4115	1.4115	3.6	3.6
			Hexachlorobenzene	ne (IS4)	0.2705	0.2804	0.2804	3.7	3.7
			Chrysene	(185)	1.0324	1.0668	1.0668	3.3	3.3
			Benzo(a)pyrene	(126)	1.1835	1.2509	1.2509	5.7	5.7

Compound (Reference IS)	()	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	384024	312973
Naphthalene	(IS2)	40/80	2646759	1152826
Fluorene	(IS3)	40/80	2305108	816564
Hexachlorobenzene	(IS4)	40/80	809868	1444254
Chrysene	(IS5)	40/80	3940883	1847115
Benzo(a)pyrene	(156)	40/80	3862774	1543947

### LDC #: 73308 \$79 SDG #: Ste Cover

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	lof_1
Reviewer:	N
2nd reviewer:	V

### 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

Sample ID: # 7 (5x)

Where: SF = Surrogate Found SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10	80	80	80	0
2-Fluorobiphenyl		80,5	81	81	
Terphenyl-d14		89.5	90	90	
Phenol-d5	150	119	79	79	
2-Fluorophenol		107.5	72	77	
2,4,6-Tribromophenol		137	88	88	
2-Chlorophenol-d4					<u> </u>
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					

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## 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

MSC = Matrix spike concentration

SC = Sample concentation

MSDC = Matrix spike duplicate concentration

MS/MSD samples:

RPD = I MSC - MSC I \* 2/(MSC + MSDC)

R

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			-	o profins		Matrix Snike	Snike	Matrix Snike Dunlicate	Dunlicate	USMISM	SD
	Sp Adc	Spike Added	Sample Concentration	Spiked Sample Concentration	tration						
puncamoj	3	4	( the / the )	(rc) (rc)	(rc / rc)	Percent Recovery	ecovery	Percent Recovery	ecovery	ичх	
Componing				V N	0 MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
	SW										
Phenol											
N-Nitroso-di-n-propylamine											
4_Chloro-3-methylinhenol											
Acomachthene	26 30	0512	Ø	1780	2050	68	68	77	77	-	14
Pentachiorophenoi											
Purene Direne	2630	2650	29	2100	2480	77	77	42	17	7	4
				<u></u>							

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.

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# 2	#: See
ГDС	SDG

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

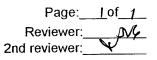
LCS/LCSD samples: LCS 260 - 13357 /2-A

	S	oike	Sp	ike		lcs	JI	L CSD		CS/LCSD
Compound	PA )	Added ( My /hr )	Concer ( 25	Concentration ( U5 / (< )	Percent	Percent Recovery	Percent Recovery	tecovery	RI	RPD
	l CS		1 CS	/ LCSD	Reported	Recalc	Reported	Recalc.	Reported	Recalculated
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2560	NA	2140	KA	\$4	64				
Pentachiorophenol										
Pyrene	095c	~~>	ress		66	99				
				2	_		١			

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. and the second sec

LDC #: 73 308 Prg SDG #: Sre Cover

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification



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



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

Concer	tratior	$ = \frac{(A_{+})(I_{+})(V_{+})(DF)(2.0)}{(A_{+})(RRF)(V_{0})(V_{+})(\%S)} $	Example:
A <sub>x</sub>	Ħ	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D,ND
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard	
l <sub>s</sub>	<u></u>	Amount of internal standard added in nanograms (ng)	Conc. = $( )( )( )( )( )( )( )$
V,	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V	=	Volume of extract injected in microliters (ul)	=
V,	=	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

2.0	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
	<u>ounproid</u>				
				· · ·	
				L	ll

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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date: June 16, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-2

Sample Identification

EB04282010-RZB

### Introduction

This data review covers 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.

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.

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- 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
MB280-13927/1-A	5/4/10	Bis(2-ethylhexyl)phthalate	1.88 ug/L	All samples in SDG 280-2995-2

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	Reported	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
EB04282010-RZB	Bis(2-ethylhexyl)phthalate	2.2 ug/L	2.2U ug/L

Sample EB04282010-RZB was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB04282010-RZB	4/28/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	No associated samples in this SDG

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

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 280-2995-2	All compounds reported below the PQL.	J (all detects)	Α

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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2995-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2995-2	EB04282010-RZB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2995-2

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2995-2	EB04282010-RZB	Bis(2-ethylhexyl)phthalate	2.2U ug/L	A	bl

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2995-2

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: 23308Q2a SDG #: 280-2995-2

Laboratory: Test America

### Date: <u>6/4/</u> Page: <u>1</u> of <u>)</u> Reviewer: <u>M4</u> 2nd Reviewer: <u>4</u>

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
l.	Technical holding times	A	Sampling dates: 4/28/10
.	GC/MS Instrument performance check	A	/
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	A	$c\omega/i\omega = 252$
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	Client Grec LCS /D
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB = 1

Note:

N = Not provided/applicable SW = See worksheet

A = Acceptable

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

Water

+	2/ EB04281/010-RZB	11	21	31	
<b>†</b> 2	EB04281010-RZB MB 280- 13927 /- K	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-Dichiorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroanliine	ll. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene <b></b> ⁺⁺	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Antilne
G. 2-Methylphenol	V. 4-Chioro-3-methylphenoi	KK. 2,4-Dinitrotoluene	ZZ. Pyrana	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chioropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
i. 4-Methylphenol	X. Hexachiorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propyiamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenžene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	11 <b>1</b> .
M. Isophorone	BB. 2-Nitroaniiine	QQ. N-Nitrosodiphenylamine (1)⊷	FFF. Di-n-octylphthalate™	nn
N. 2-Nitrophenol**	CC. Dimethyiphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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.

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## VALIDATION FINDINGS WORKSHEET **Blanks**

み Page: lof Ö 2nd Reviewer: 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".

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level? N N/A N/A

Was a method blank associated with every sample? /N N/A

V N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 5/64/60 Blank analysis date: 5/6/60бh Conc. units:

Associated Samples:

2 P P

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ation						
Sample Identification						
		2.2 M	/			
	MB 280-18927/A					
Blank ID	MB 280-1	1.88				
Compound		EFF				
Ű						

Blank analysis date: Blank extraction date:\_

C

5x Phthalates 2x all others

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LDC #: 73305 239	G.	VAL	IDATION FIN	IDATION FINDINGS WORKSHEET Field Blanks		Page: 1 of 1 Reviewer: 016 2nd Reviewer: 016
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)Y N N/AWere field blanks identified in this SDG?Y N N/AWere target compounds detected in the fieldY N NIAWere target compounds detected in the fieldBlank units:Ug /L	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the f	1 8270C) this SDG? ted in the field I inits: NA	blanks?			
Sampling date: 4 / 2 & / 2 Field blank type: (circle one) Field Blank / Rinsate / Other:	2 e) Field Blank / Ri	nsate / Other:	EB	Associated Samples:	Nme	
Compound	Blank ID			Sample Identification	ation	
EFE	2,2					
CROL						
	Associated sample units:	units:				
Sampling date:	e) Field Blank / R	insate / Other:		Associated Samples:		
Compound	Blank ID			Sample Identification	cation	
CROL						
5x Phthalates 2x All others						

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

Soil

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date: June 16, 2010

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-5

### Sample Identification

SSAN6-07-1BPC\*\* SSAN6-07-2BPC SSAN6-07-1BPCMS SSAN6-07-1BPCMSD

\*\*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, 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 gualifier 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
MB280-14738/9-A	5/10/10	Bis(2-ethylhexyl)phthalate	72.7 ug/Kg	All samples in SDG 280-2995-5

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
SSAN6-07-1BPC**	Bis(2-ethylhexyl)phthalate	98 ug/Kg	98U ug/Kg
SSAN6-07-2BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg

Sample FB-04072010-RZC (from SDG 280-2280-2) was identified as a field blank. No semivolatile contaminants were found in this blank.

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

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

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-5	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2995-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2995-5	SSAN6-07-1BPC** SSAN6-07-2BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2995-5

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2995-5	SSAN6-07-1BPC**	Bis(2-ethylhexyl)phthalate	98U ug/Kg	A	bl
280-2995-5	SSAN6-07-2BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	А	bl

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2995-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B /4

LDC #: 23308R2a SDG #: 280-2995-5

Laboratory: Test America

### Date: 6/5/10 Page: 1 of 1 Reviewer: <u>N</u> 2nd Reviewer: 9

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: 4 /28 /10
iI.	GC/MS Instrument performance check	A	
111.	Initial calibration	Ä	
IV.	Continuing calibration/ICV	A	Carla E252
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	Á	us
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	M A	
XII.	Compound quantitation/CRQLs	NA	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	NA	
XV.	Overall assessment of data	Á	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FB=FB-04072010-RZC (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

		ated Samples:	Soil
¥	¥	Stage 4	-2011

1	SSAN6-07-1BPC * *	+ 11	MB 280- 14738/9-A	21	31	
2	SSAN6-07-2BPC	12		22	32	
3	SSAN6-07-1BPCMS	13		23	33	
4	SSAN6-07-1BPCMSD	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	

23318 R22 LDC #: SDG #: See Cover

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### **VALIDATION FINDINGS CHECKLIST**

### Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
1. 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?		۲		
Were all samples analyzed within the 12 hour clock criteria?			11.11.12.12.12.12.12.12.12.12.12.12.12.1	
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?	<u> </u>			
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?				
IVI 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.		<b>.</b>		
VI. Sunogate spikes				a and the second second second
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?	7			
Were the MS/MSD percent recoveries (%R) and the relative percent differences				
(RPD) within the QC limits?			6 (m.B.	AND THE PARTY AND A PARTY AND A PARTY
VIII Laboratory control samples Was an LCS analyzed for this SDG?				

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### VALIDATION FINDINGS CHECKLIST

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	$\square$			
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?		1000 AND		
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?	4	[		
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<u> </u>			
Were chromatogram peaks verified and accounted for?		1		
XII. Compound quantitation/CROLs	T T	I	l (	
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?	/	ł		
XIII. Tentatively identified compounds (TICs)				States and the second
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within <u>+</u> 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.		F		
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.		1		
XVI. Field duplicates		- ģi -		
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.				X
XVII. Field blanks				
Field blanks were identified in this SDG.	7	1	T	
Target compounds were detected in the field blanks.			1	

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

VALIDATION FINDINGS WORKSHEET

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	llł. 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 <del>**</del>	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	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	00. 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**	nnu
N, 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
0. 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.

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### VALIDATION FINDINGS WORKSHEET **Blanks**

36 Page: 1 of 1 σ Reviewer: 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"

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?

 $\sqrt{N N/A}$  Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 5/6/10 Blank analysis date: 5/10/10Y/N N/A Y N/A

/KQ

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Conc. units:

₩ F Associated Samples:

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Sample Identification					
San					
	7	120 /u			
	-	98/4			
	7-38 / 4-4				
Blank ID	ANB 260-14738 ANA	72.7			
о Т		EEE			
Compound					

Blank analysis date: Blank extraction date:\_

Associated Samples:

1

Conc. units:		Associated Samples:
Compound	Blank ID	

5x Phthalates 2x all others

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LDC #: 23306 R24 SDG #: 24 Cm

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

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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:

 $\label{eq:RFF} RFF = (A_x)(C_s)/(A_{ts})(C_x)$  average RFF = 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

										-
					Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration			RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID Date	Date	Compound (Internal Standard)	ndard)	( 50 std)	( 50 std)	(Initial)	(Initial)		
-	ICAI	5/8/2010	5/8/2010 1.4-Dioxane	(IS1)	0.5851	0.5851	0.5791	0.5791	6.8	6.82
-	U SM		Naphthalene	(IS2)	1.0818	1.0818	1.0917	1.0917	2.8	2.83
	2000		Flintene	([S3)	1.3573	1.3573	1.3205	1.3205	6.7	6.66
			Havachlorohenzene	(154)	0.2608	0.2608	0.2633	0.2633	9.5	9.48
			Christene	(135)	1.0472	1.0472	1.0309	1.0309	3.1	3.14
			Benzo(a)byrene	(186)	1.0983	1.0983	1.0834	1.0834	13.3	13.28

	6	7	7	9	N	n
Area IS	305776	1135207	755377	1381076	1678262	1546473
Area cpd	223629	1535127	1281626	450249	2196814	2123114
onc IS/Cpd	40/50	40/50	40/50	40/50	40/50	40/50

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.5215	1.1002	1.1947		1.0331	0.8317
10.00	0.6382	1.0477	1.2120	0.2263	1.0128	0.9476
20.00	0.6300	1.0478	1.2639	0.2397	1.0223	1.0101
50.00	0.5851	1.0818	1.3573	0.2608	1.0472	1.0983
80.00	0.5842	1.0953	1.3253	0.2600	1.0539	1.1259
20.00	0.5666	1.1092	1.3832	0.2754	1.0748	1.1887
60.00	0.5529	1.1267	1.3955	0.2815	1.0367	1.2251
200.00	0.5544	1.1249	1.4319	0.2996	0.9663	1.2400
1	0.5791	1.0917	1.3205	0.2633	1.0309	1.0834
11	0.0395	0.0309	0.0879	0.0250	0.0324	0.1439

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 # 73 30 8 29 SDG # <u>See Cover</u>

# VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page 1 of 1 Reviewer: <u>3VL</u> 2nd Reviewer: <u>C</u>

# 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:

Where:

F)/ave. RRF	
)ifference = 100 * (ave. RRF - RRF)/ave. F	.RF = (Ax)(Cis)/(Ais)(Cx)
% Differ	RRF = (

ave. RRF = initial calibration average RRF RRF = continuing calibration RRF Ax = Area of compound Ais = Ar

 Ax = Area of compound
 Ais = Area of associated internal standard

 Cx = Concentration of compound
 Cis = Concentration of internal standard

		Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	МD	%D
	D4891	05/12/10	1.4-Dioxane (IS1)	0.5791	0.5249	0.5249	9.4	9.4
-			Naphthalene (IS2)	1.0917	1.0945	1.0945	0.3	0.3
				1.3205	1.3456	1.3456	1.9	1.9
			robenzene	0.2633	0.2713	0.2713	3.0	3.1
				1.0309	1.0161	1.0161	1.4	1.4
			Vrene	1.0834	1.1127	1.1127	2.7	2.7

Compound (Reference IS)		Concentration	Area Cpd	Area IS
-		(IS/Cpd)		
1.4-Dioxane	(IS1)	40/80	383501	365302
Naphthalene	(IS2)	40/80	2883187	1317169
Fluorene	(IS3)	40/80	2383317	885592
Hexachlorobenzene	(IS4)	40/80	850720	1567635
Chrvsene	(IS5)	40/80	4037721	1986787
Benzo(a)pvrene	(186)	40/80	4197272	1886084

SDG #: Sre Cover

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	<u>lof 1</u>
Reviewer:	JV6
2nd reviewer:	1

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

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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

×	14-
Sample ID:	#
Sample iv.	

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10	72,6	73	73	0
2-Fluorobiphenyl		77.3	77	77	
Terphenyl-d14	1	99, Y	99	99	
Phenol-d5	150	21.3	<u>ŝ</u> ]'	81	
2-Fluorophenol		119.4	80	80	
2,4,6-Tribromophenol	X	121.7	81	13	K
2-Chlorophenol-d4		,			
1,2-Dichlorobenzene-d4				<u>l., , , , , , , , , , , , , , , , , , , </u>	<u>l</u>

### Sample ID:

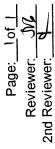
	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5				-	
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5				· · · · · · · · · · · · · · · · · · ·	
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4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

### 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				l	

LDC #: 73308 12a SDG #: Sec Carer

# VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates Results Verification



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

RPD = I MSC - MSC I \* 2/(MSC + MSDC)

m

MS/MSD samples: \_\_\_\_\_

Where: SSC = Spiked sample concentration SA = Spike added

MSC = Matrix spike concentration

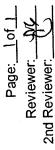
SC = Sample concentation

MSDC = Matrix spike duplicate concentration

				C niked S	aluma	Matrix Snike	Snike	Matrix Snike Dunlicate	Duplicate	USM/SM	SD.
	Added	e v v	Sample Concentration	Concentration	ration c, /	Percent Recovery	acovery	Percent Recovery	есочегу	RPD	
Composite				, SM	Msn	Renorted	Recalc	Reported	Recalc	Reported	Recalculated
		new									
Phenol	-										
N-Nitroso-di-n-propylamine											
4 Chloro 3 methydrhenol											
	28 60	1780	¢	2210	2220	80	ď٥	78	78	'n	r
Acenaprutierie											`
Pentachlorophenol											
Pyrene	0)82	2860	7	2490	2460	87	62	ax X	86		

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.

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LDC	C C C C



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:

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

LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

A-0/85771-020 Š LCS/LCSD samples:

RPD = I LCSC - LCSDC I \* 2/(LCSC + LCSDC)

	Added	ike Jed	Concentration	tration	Percent Recovery	lecoverv	Percent Recovery	lecovery	RI	RPD
Compound	(m)	/F. )								
	ν -		1 CS		Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N Nitroco di annovamine										
4-Chloro-3-methylphenol				57	77	1				
Acenaphthene	2570	NA	1590	47	/ /	\ \ \				
						~				
Pentachlorophenol	,				60	60	/			
Pyrene	2570	7	2260		8	0				
							$\backslash$			
							<del></del>	:	2	

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

### LDC #: <u>7330</u>8 R29 SDG #: <u>Sre Cov</u>er

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	NE
2nd reviewer:	J.

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

	<u>N/A</u> N/A	Were all reported results recalculated and were all recalculated results for detected ta	verified for all level IV samples? arget compounds agree within 10.0% of the reported results?
Conc A <sub>x</sub>	centration =	$ \begin{array}{l} f = (A_{a})(I_{a})(V_{b})(DF)(2.0) \\ (A_{b})(RRF)(V_{a})(V_{b})(\%S) \\ \mbox{Area of the characteristic ion (EICP) for the compound to be measured} \end{array} $	Example: Sample I.D,SS
$A_{is}$	Ξ	Area of the characteristic ion (EICP) for the specific internal standard	19 2x-r 40 1.0ml10m
I,	=	Amount of internal standard added in nanograms (ng)	$Conc. = \frac{(19\ 2455)(40)(1.0m/)(1000)(}{(1395354)(0,2633)(31.50g^{-1}(0,92j^{-1})())}$
V,	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V,	=	Volume of extract injected in microliters (ul)	= 122, 7
V,	=	Volume of the concentrated extract in microliters (ul)	= 722.3 2 720 ng kag
Df	=	Dilution Factor.	n not ing they
%S	=	Percent solids, applicable to soil and solid matrices only.	
20	=	Factor of 2 to account for GPC cleanup	

2.0	= Factor of 2 to account		Reported Concentration	Calculated Concentration	
#	Sample ID	Compound			Qualification
<b> </b>					
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			-		
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### Laboratory Data Consultants, Inc. Data Validation Report

June 16, 2010

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

April 29, 2010

Soil

LDC Report Date:

**Collection Date:** 

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-3

Sample Identification

SSAO5-05-2BPC

### 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 gualifier 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 FB-04072010-RZC (from SDG 280-2280-2) was identified as a field 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

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	Criteria	Flag	A or P
	Benzo(b)fluoranthene Benzo(k)fluoranthene	the samples, the laboratory	Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3059-3	All compounds reported below the PQL.	J (all detects)	А

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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3059-3

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3059-3	SSAO5-05-2BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-3059-3	EB04282010-RZB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3059-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3059-3

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: <u>23308T2a</u> SDG #: 280-3059-3

SDG #: 280-3059-3 Laboratory: Test America Stage 2B

Date: <u>6/4//</u> Page: <u>bf</u> Reviewer: <u>VL</u> 2nd Reviewer:

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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
1.	Technical holding times	A	Sampling dates: 4 /29 /10
11.	GC/MS Instrument performance check	A	· · · · · · · · · · · · · · · · · · ·
.	Initial calibration	A	2 RSD 12
IV.	Continuing calibration/ICV	A	2 RSD r CONTAN 6252
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client grec
VIII.	Laboratory control samples	A	client grec LCS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
<b>X</b> III.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FB = FB - 04072010 - RZC (280 -2 280-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soi

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAO5-05-2BPC	11	21	31
2	MB 280- 14337/1-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(∎)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichiorobenzene	GG. Acenaphthene <sup>™</sup>	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-Dichlorobenzenet	T. 4-Chioroanliine	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene <b>*</b> *	JJ. Dibenzofuran	YY. Fluoranthene	NNN. Anline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenol	KK. 2,4-Dinitrotoluene	ZZ. Pyrana	000. N-Nitrosodimethylamine
H. 2,2"-Oxybis(1-chloropropane)	W. 2-Methylnáphthalene	LL. Diethyiphthalate	AAA. Butylbenzylphthaiate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyi alcohoi
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthaiene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-othylhoxyl)phthalate	ттт.
M. Isophorone	BB. 2-Nitroaniilne	QQ. N•Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
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.

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# **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	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". <u>Y N N/A</u> 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?

Ī						
1		Q	Finaina	Associated Samples	Qualifications	
*			660 HHH un resolved	11 .	J/MJ/P	(3)
						0 /
Com	ments: See	Comments: See sample calculation verification worksheet for recalculations	ksheet for recalculations			

COMQUA.2S

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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 29, 2010

LDC Report Date: June 22, 2010

Soil

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-4

### Sample Identification

SSAQ4-04-1BPC SSAO4-05-1BPC SSAO4-05-1BPC\_FD

### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Sample FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-3059-4

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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	Criteria	Flag	A or P
SSAQ4-04-1BPC SSAO4-05-1BPC SSAO4-05-1BPC_FD	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.	Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3059-4	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

Samples SSAO4-05-1BPC and SSAO4-05-1BPC\_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentration (ug/Kg)			Difference		
Compound	SSAO4-05-1BPC	SSAO4-05-1BPC_FD	RPD (Limits)	(Limits)	Flags	A or P
Benzo(b)fluoranthene	32	38	-	6 (≤340)	-	-
Benzo(g,h,i)perylene	22	21		1 (≤340)	-	-
Hexachlorobenzene	46	64	-	18 (≤340)	-	-
Pyrene	13	15	-	2 (≤340)	-	-

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3059-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3059-4	SSAQ4-04-1BPC SSAO4-05-1BPC SSAO4-05-1BPC_FD	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-3059-4	SSAQ4-04-1BPC SSAO4-05-1BPC SSAO4-05-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3059-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3059-4

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: <u>23308U2a</u> SDG #: <u>280-3059-4</u>

SDG #: 280-3059-4 Laboratory: Test America Date: <u>b / 4 / 10</u> Page: <u>1 of /</u> Reviewer: <u>M</u> 2nd Reviewer: <u>\_\_\_\_</u> Stage 2B

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: 4/29 /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	$2 \text{ KSD } \text{ r}^{\gamma}$ $(\alpha)/(\alpha) \leq 252$
IV.	Continuing calibration/ICV	<u> </u>	$(\alpha)/(\alpha) \leq 252$
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Ń	Client spec
VIII.	Laboratory control samples	<u> </u>	us
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Ą	
XVI.	Field duplicates	SW)	D = 2,3
XVII.	Field blanks	SW	FB = FB04062010-RZB (280-2131-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAQ4-04-1BPC	11	21	31
2	SSAQ4-05-1BPC	12	22	32
3	<u> </u>	13	23	33
4	SSAQ4-05-1BPC_FD D MB 280- 13949 /21A	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)

			\$ 	HI Dorocota
A. Pheno!**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	11. Pentachiorophenol-	III. Detizo(a)/Pyterie
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-Chioroaniline	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene"	JJ. Dibenzofur <del>a</del> n	YY. Fluoranthene"	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Oichiorobenzidine	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-Trichlorophanol	00, 4-Nitroaniline	DDD. Chrysene	SSS, Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate	nnn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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 #: <u>&gt;&gt;&gt;08 U</u> 20 SDG #: <u>Sec Con</u>	VALIE	VALIDATION FINDINGS WORKSHEET Field Blanks	DRKSHEET		Page: 0f ) Reviewer: <u>N(</u> 2nd Reviewer: 0
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)Y N N/AWere field blanks identified in this SDG?Y N N/AWere target compounds detected in the field blanks?Sampling date:4 0 6 / 0Sampling date:4 0 6 / 0Field blank Ninste / Oricle one) / field Blank Ninste / Other	Method 8270C) iffied in this SDG? Is detected in the field bl imple units: <u>10</u> /ES		Associated Samples:	(av) (14	
Compound Blank ID			Sample Identification	uc	
I I	2010-RZB				
<b>FEF</b> 2,7					
×					
CROL					
Blank units: Associated sample units:	imple units:				
Sampling date:	ank / Rinsate / Other:	Associate	Associated Samples:		
Compound Blank ID			Sample Identification	uo	
CROL					

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5x Phthalates 2x All others FBLKASC2tronox.wpd

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# **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET

\_of Page: \_\_\_\_ Reviewer: 2nd Reviewer:

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

N N

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

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? **NA** 

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Date												
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COMQUA.2S

LDC#: <u>23308U2a</u> SDG#:<u>See cover</u>

### VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: / of / Reviewer: <u>M</u> 2nd Reviewer: <u>Y</u> 

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

Y/N NA Were field duplicate pairs identified in this SDG?

 $\frac{1}{\sqrt{N}}$  Were target analytes detected in the field duplicate pairs?

	Conc	ug/Kg)	RPD	Diff	Diff Limits	Quals	
Compound Name	2	3	(≤50%)			(Parent Only)	
Benzo(b)fluoranthene	32	38		6	≤340		
Benzo(g,h,i)perylene	22	21		1	≤340		
Hexachlorobenzene	46	64		18	≤340		
Pyrene	13	15		2	≤340		

V:\FIELD DUPLICATES\23308U2a.wpd

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 29, 2010

Soil

LDC Report Date: June 16, 2010

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-6

### Sample Identification

SSAO4-03-3BPC SSAO4-03-3BPCMS SSAO4-03-3BPCMSD

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### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Sample FB-04072010-RZC (from SDG 280-2280-2) was identified as a field blank. No semivolatile contaminants were found in this blank.

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### XI. Target Compound Identifications

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 280-3059-6	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3059-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3059-6	SSAO4-03-3BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3059-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3059-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308V2a

SDG #: 280-3059-6

Laboratory: Test America

Stage 2B

Date: <u>6 / 4 //o</u> Page: <u>1 of )</u> Reviewer: <u>M</u> 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: 4/29 /10
11.	GC/MS Instrument performance check	A	
.	Initial calibration	A	2 KSD NY
IV.	Continuing calibration/ICV	A	$2 RSD $ $n^{\gamma}$ $Con / 14 \leq 25 2$
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	ICS
IX.	Regional Quality Assurance and Quality Control	N	
<b>X</b> .	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	₩
XVII.	Field blanks	ND	FB = FB-0407 2010 - RZC (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:

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[	1	T				
1	SSAO4-03-3BPC	11	2	21	 31	
2	SSAO4-03-3BPCMS	12	2	22	32	
3	SSAO4-03-3BPCMSD	13	2	23	33	
4	MB 280-14337 /-A	14	2	24	 34	
5		15	2	25	 35	
6		16	2	26	 36	
7		17	2	27	 37	
8		18	2	28	38	
9		19	2	29	39	
10		20	3	30	40	

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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 29, 2010

LDC Report Date:

June 16, 2010

Soil

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-8

### Sample Identification

SSAQ3-01-6BPC SSAQ3-01-6BPCMS SSAQ3-01-6BPCMSD

### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Sample FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-3059-8

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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	Criteria	Flag	A or P
SSAQ3-01-6BPC	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.	Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

### All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3059-8	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3059-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3059-8	SSAQ3-01-6BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-3059-8	SSAQ3-01-6BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3059-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3059-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson	
VALIDATION COMPLETENESS WORKS	HEET

LDC #: 23308W2a

SDG #: 280-3059-8 Laboratory: Test America Date: <u>6//a</u> //<sub>0</sub> Page: <u>lof</u> Reviewer: <u>N</u> 2nd Reviewer: <u>Q</u> Ę

Stage 2B

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
١.	Technical holding times	A	Sampling dates: 4/29 /ro
11.	GC/MS Instrument performance check	<u> </u>	
111.	Initial calibration	A	$\frac{2}{\cos 1 \cos 25}$
IV.	Continuing calibration/ICV	A	$c \omega / \omega \leq 25 $
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	US
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	Ń	
XVII.	Field blanks	SN	FB = FB04062010-RZB (280-2131-~)

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:

1	SSAQ3-01-6BPC	11	, ,	21	31
2	SSAQ3-01-6BPCMS	12		22	32
3	SSAQ3-01-6BPCMSD	13		23	33
4	MB 280-14919 /4-A	14		24	34
5	/	15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

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

A Phenol**	P. Bis(2-chioroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenoi⊷	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	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)pery <sup>i</sup> ene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene <del>**</del>	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Anlline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
I. 4-Methylphenoi	X. Hexachiorocyclopentadiene*	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. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniine	DDD. Chrysene	SSS, Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	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	תתת
N. 2-Nitrophenol*	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluorsnthene	.www.

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

COMPNDL

# VALIDATION FINDINGS WORKSHEET

HEET Page: 1 of 1 Reviewer: 3/6 2nd Reviewer: 4	les: A 1) (ND)	Sample Identification							oles:	Sample Identification				
VALIDATION FINDINGS WORKSHEET <u>Field Blanks</u>	0C) SDG? In the field blanks? いろうろう A リ Associated Samples: Aリ								a / Other: Associated Samples:					
LDC #: ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	METHOD: GC/MS BNA (EPA SW 846 Method 8270C)Y N N/AWere field blanks identified in this SDG?W N/AWere target compounds detected in the field blackW N/AWere target compounds detected in the field blackSampling date:4 / 56 / 10Eicle blackMethod 8270C)Sampling date:4 / 56 / 10Eicle blackMethod 82 / 10Were target compounds detected in the field blackWere target compoundsWere tar		Compound FB of 62 20/0- K2B	EFF 2.7			CROL	Blank units: Associated sample units:	Sampling date:	Compound Blank ID				

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5x Phthalates 2x All others

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## **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET

ç Reviewer: Page: \_ 2nd Reviewer:

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

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? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N W/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used AN NA z ≻

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			GGG, HHH Unredired		J/MJ /p (c)
		•			> 0
		Community	kshaat for racalculations		
Ē	merits. Jee	Salliple calculation ventication wo	<u>1311661 101 1 500100110110</u>		

COMQUA.2S

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

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 30, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3100-1

### Sample Identification

SSAQ5-01-9BPC SSAQ5-01-7BPC SSAQ5-01-5BPC SSAQ5-01-3BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD SSAQ5-01-5BPCMS SSAQ5-01-5BPCMSD

### Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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.

Sample FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-3100-1

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

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

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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	Criteria	Flag	A or P
SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	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.	Target compounds must be properly resolved and quantitated as individual compounds.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3100-1	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

Samples SSAQ5-01-1BPC and SSAQ5-01-1BPC-FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/Kg)	000	D'#		
Compound	SSAQ5-01-1BPC	SSAQ5-01-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(a)anthracene	22	340U	•	318 (≤340)	-	-
Benzo(b)fluoranthene	51	27	-	24 (≤360)	-	-
Benzo(g,h,i)perylene	20	340U	-	320 (≤340)	-	-
Chrysene	32	340U	-	308 (≤340)	-	-

	Concentra	tion (ug/Kg)		D://		
Compound	SSAQ5-01-1BPC	SSAQ5-01-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	3300	2200	40 (≤50)	-	-	-
Octachlorostyrene	660	460	-	200 (≤360)	-	-
Pyrene	25	18	-	7 (≤360)	-	-

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### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3100-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3100-1	SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Project Quantitation Limit (q)
280-3100-1	SSAQ5-01-9BPC SSAQ5-01-7BPC SSAQ5-01-5BPC SSAQ5-01-3BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

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LDC #: 23308X2a SDG #: 280-3100-1

### Stage 2B

Date: <u>6 /4 /1</u> Page: <u>1 of /</u> Reviewer: <u>//</u> 2nd Reviewer: <u>//</u>

Laboratory: Test America

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

V

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	
۱.	Technical holding times	A	Sampling dates: 4 /30 /10	
11.	GC/MS Instrument performance check	À.	, 	
HI.	Initial calibration	A	2 RSD rr	
IV.	Continuing calibration/ICV	A	$2 RSD r^{\gamma}$ $CQV / IQV \leq 252$	
V.	Blanks	A	,	
VI.	Surrogate spikes	A		
VII.	Matrix spike/Matrix spike duplicates	A		
VIII.	Laboratory control samples	A	ICS	
IX.	Regional Quality Assurance and Quality Control	N		
Х.	Internal standards	A		
XI.	Target compound identification	N		
XII.	Compound quantitation/CRQLs	SW		
XIII.	Tentatively identified compounds (TICs)	N		
XIV.	System performance	N		
XV.	Overall assessment of data	A		
XVI.	Field duplicates	SW	$b = 5_{fb}$	
XVII.	Field blanks	SW	FB = FB04062010- RZB	(280-2131-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soi)

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAQ5-01-9BPC	- 11	MB 280- 139 52/1-A	-21		31	
2	SSAQ5-01-7BPC	12	/	22		32	
3	SSAQ5-01-5BPC	13		23		33	
4	SSAQ5-01-3BPC	14		24		34	
5	SSAQ5-01-1BPC	15		25	· · · · · · · · · · · · · · · · · · ·	35	
6	SSAQ5-01-1BPC-FD	16		26		36	
7	SSAQ5-01-5BPCMS	17		27		37	
8	SSAQ5-01-5BPCMSD	18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

-				
A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachiorophenol™	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	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-Dichiorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroanliine	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chioroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene⊷	JJ. Dibenzofur <del>a</del> n	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenol	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthaiate	AAA. Butyibenzyiphthalate	PPP, Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyi alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenoi	00. 4-Nitroanillne	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octyiphthalate	nın
N. 2-Nitrophenol**	CC. Dimethyiphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	, ww
0. 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.

COMPNDL

LDC #: <u>33308 X</u> 29 SDG #: <u>2e, Cn-</u> V		VALIDATIC	VALIDATION FINDINGS WORKSHEET <u>Field Blanks</u>	SHEET	Page: of /
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)         Y N N/A       Were field blanks identified in this SDG?         Y N N/A       Were target compounds detected in the field         W N/A       Were target compounds detected in the field         Blank units:       Wore target compounds detected in the field         Blank units:       Wore target compounds detected in the field         Each blank true:       Circle one Field Blank Rineste / Other	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the f 5 /L Associated sample units: W 2 / Circle one Field Blank) Rinsate / Oth	270C) is SDG? d in the field blanks? ts:	Accordated Samulac	// ¥ Molec	ZNG KEVIEWER.
Compound	Blank ID			Ē	
	FB0406 200 - KZB	A A			
1921	2,2				
cRaL					
	Associated sample units:	ls:			
Field blank type: (circle one) Field Blank / Rinsate / Other:	Field Blank / Rinse	ate / Other:	Associated Samples:	mples:	
Compound	Blank ID		Sa	Sample Identification	
crat					

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5x Phthalates 2x All others 

X 2a	2
6	3
233	J
#	#
g	SDG

## VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

父 of Page: \_ Reviewer: 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".

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? Y N MIA Y N( N/A

	Qualifications	J/45/P (g)										
	Associated Samples	1 resolved										
	Finding	GGG. HHH PEAKS Whresolved	•									
	Sample ID	5 (										
<b>)</b>	Date											
	*											

Comments: See sample calculation verification worksheet for recalculations

### VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: ł of Reviewer: 2nd Reviewer:

1

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

<u>Y N NA</u>

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

	Conc	( ug/Kg)	RPD	Diff	Diff Limits	Quals	
Compound Name	5	6	(≤50%)			(Parent Only)	
Benzo(a)anthracene	22	340U		318	≤340		
Benzo(b)fluoranthene	51	27		24	≤360		
Benzo(g,h,i)perylene	20	340U		320	≤340		
Chrysene	32	340U		308	≤340		
Hexachlorobenzene	3300	2200	40				
Octachlorostyrene	660	460		200	<b>≤360</b>		
Pyrene	25	18		7	≤360		

V:\FIELD DUPLICATES\23308X2a.wpd

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 30, 2010

Soil

LDC Report Date: June 16, 2010

Matrix:

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3100-4

### Sample Identification

SSAK7-05-1BPC SSAK7-05-1BPC\_FD

### Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

### **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

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

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

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

### V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-14276/1-A	5/6/10	Bis(2-ethylhexyl)phthalate	60.1 ug/Kg	All samples in SDG 280-3100-4

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
SSAK7-05-1BPC	Bis(2-ethylhexyl)phthalate	94 ug/Kg	94U ug/Kg
SSAK7-05-1BPC_FD	Bis(2-ethylhexyl)phthalate	86 ug/Kg	86U ug/Kg

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-3100-4

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3100-4	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

Samples SSAK7-05-1BPC and SSAK7-05-1BPC\_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentra	ation (ug/Kg)	RPD	Difference		
Compound	SSAK7-05-1BPC	SSAK7-05-1BPC_FD		(Limits)	Flags	A or P
Bis(2-ethylhexyl)phthalate	94	86	-	8 (≤350)	-	-
Dimethyl phthalate	40	350U	-	310 (≤350)	-	-

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3100-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3100-4	SSAK7-05-1BPC SSAK7-05-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3100-4

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-3100-4	SSAK7-05-1BPC	Bis(2-ethylhexyl)phthalate	94U ug/Kg	A	bl
280-3100-4	SSAK7-05-1BPC_FD	Bis(2-ethylhexyl)phthalate	86U ug/Kg	A	bl

### Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3100-4

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-3100-4 Laboratory: Test America

23308Y2a

LDC #:\_\_\_\_

### Date: 6/14 //o Page: 1 of / Reviewer: 51/C 2nd Reviewer: 0

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
l.	Technical holding times	A	Sampling dates: + /20 /10
11.	GC/MS Instrument performance check	A	, ,
111.	Initial calibration	Á	2 RSD rr CCU/ICU = 253
IV.	Continuing calibration/ICV	Å	CCU/ICU = 250
V.	Blanks	SW	,
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec.
VIII.	Laboratory control samples	A	Client Spec. US
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Á	
XVI.	Field duplicates	SW	$D = 1, \gamma$
XVII.	Field blanks	SN)	tB = Fb-04072010- RZD (280-2216->)

Note:

te: A = Acceptable N = Not provided/applicable SW = See worksheet

Soi)

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAK7-05-1BPC	11	21		31
2	SSAK7-05-1BPC_FD	12	22		32
3 <sup>+</sup>	MB 280 - 14276/1-A	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	1	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 <del>**</del>
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF, 3-Nitroaniine	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Díbenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)peryiene
E. 1,4-Dichlorobenzene**	T. 4-Chioroaniiine	ll. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene⊷	JJ. Dibenzofur <del>a</del> n	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methyiphenoi	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methyiphenol	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(s)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroanliine	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-octy/phthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyi-phenylether	GGG. Benzo(b)fluoranthene	ww.
0. 2,4-Dimethyiphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

COMPNDL

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### VALIDATION FINDINGS WORKSHEET **Blanks**

NG Page: 1 of 7 Reviewer: 2nd Reviewer:

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

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

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level? Y N N/A Y/N N/Y

Was a method blank associated with every sample?

 $\sqrt{N N/A}$  Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 5/66/10 Blank analysis date: 5/15/10

₹ Associated Samples:

(19)

	tion					
A 1/	Sample Identification					
	0					
Associated Samples:		٨	86 N			
			94 /u	/		
<b>`</b>		4-1-2-2-14-2-03c QU				
	Blank ID	1-oze quy	(09			
Conc. units: <u>w /</u> Ł <sub><!--</sub--></sub>	Compound		EFE			

Blank analysis date:\_ Blank extraction date:\_

Associated Samples:					
	Sample Identification				 
	Sample				
	Blank ID				
onc. units:	g				
	Compound				
onc. L					

5x Phthalates 2x all others

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LDC #:	SDG #:

# VALIDATION FINDINGS WORKSHEET Field Blanks



Were field blanks identified in this SDG?	Were target compounds detected in the field
<u> </u>	Y N N/A

were target compounds detected in the field blanks? Blank units: レッノレ Associated sample units: レッノト Sampling date: イッフ/い Field blank type: (circle one) Keld Blank/ Rinsate / Other:

A I)	uo				
mples:	Sample Identification				
Associated Samples:	Sa				
4			Fb)		
her:			> 5× Fb)		
/ Rinsate / Other:		0- RZD			
Red Blank	Blank ID	FB-04672010-RZD	2.7	 	
ield blank type: (circle one) Reld Blank	Compound		EEE		

Associated sample units:\_

CRQL

Blank units: Sampling date:

Field blank type: (circle one) Field Blank / Rinsate / Other:	Field Blank	<pre>c / Rinsate / Other:</pre>	Associated Samples:	amples:			
Compound	Blank ID		Ő	Sample Identification	E		
CRQL							

5x Phthalates 2x All others

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### VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	
Reviewer:	.W.
2nd Reviewer:	Q

### -METHOD: GC/MS PAH (EPA SW 846 Method 8270C)

Y<u>N NA</u> Y<u>N NA</u>

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

Compound Name	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	1	2	KPD (≤50%)	Diii		(Parent Only)
bis(2-ethylhexyl)phthalate	94	86		8	<b>≤350</b>	
Dimethyl phthalate	40	350U		310	≲350	

V:\FIELD DUPLICATES\23308Y2a.wpd

## Laboratory Data Consultants, Inc. Data Validation Report

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 30, 2010

LDC Report Date: June 16, 2010

Matrix:

Parameters:

**Project/Site Name:** 

Semivolatiles

Soil

Validation Level: Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3100-6

Sample Identification

SSAK6-03-3BPC

### 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.

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- 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 gualifier 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
MB280-14475/1-A	5/7/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-3100-6

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	Reported	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
SSAK6-03-3BPC	Bis(2-ethylhexyl)phthalate	83 ug/Kg	83U ug/Kg

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-3100-6

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

### VI. Surrogate Spikes

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

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

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

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

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

### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

### XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3100-6	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, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3100-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3100-6	SSAK6-03-3BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3100-6

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-3100-6	SSAK6-03-3BPC	Bis(2-ethylhexyl)phthalate	83U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-3100-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3100-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #:\_\_\_\_ 23308Z2a SDG #: 280-3100-6

Laboratory: Test America

Stage 2B

Da	ate:	6/1	4/10
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Reviev	ver:_	$\mathfrak{I}$	16
2nd Review	ver:_	Q	

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: 4 /30 /ro	
<u>-</u>	GC/MS Instrument performance check	A	,	
111.	Initial calibration	A	2 KSD rr	
IV.	Continuing calibration/ICV	A	$2 \text{ KSD } r^{\gamma}$ Car/iar = 25 2	
V.	Blanks	SN		
VI.	Surrogate spikes	A		
VII.	Matrix spike/Matrix spike duplicates	N	Client SNC	
VIII.	Laboratory control samples	A	Client Spec. LCS	
IX.	Regional Quality Assurance and Quality Control	N		
<b>X</b> .	Internal standards	A		
XI.	Target compound identification	N		
XII.	Compound quantitation/CRQLs	N		
XIII	Tentatively identified compounds (TICs)	N		
XIV.	System performance	N		
XV.	Overall assessment of data	A		
XVI.	Field duplicates	N		
XVII.	Field blanks	SW	FB = FB- 04 07 2010 - RZD	(280-2216-7)

A = Acceptable N = Not provided/applicable Note:

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

SW = See worksheet

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1	SSAK6-03-3BPC	11	21	31	
42	MB 280-14475/1-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	

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

A. Phenol <sup>tt</sup>	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-Nitroanijine	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acen≇phthane™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Banzo(g,h,i)perylene
E. 1,4-Dichiorobenzene**	T. 4-Chloroanliine	ll. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene <sup>™</sup>	JJ. Dibenzofur <del>a</del> n	YY. Fluoranthene"	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methyiphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methyinaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzole Acid
l. 4-Methylphenol	X. Hexachlorocyciopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Banzyi alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichiorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachioroethane	Z. 2,4,5-Trichlorophenol	00, 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octyiphthalate	UUU
N. 2-Nitrophenoi**	CC. Dimethyiphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
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.

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# VALIDATION FINDINGS WORKSHEET

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# VALIDATION FINDINGS WORKSHEET **Blanks**

R Page: \_\_\_\_\_of\_\_\_ Reviewer:\_\_\_ 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".

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level?

Y N N/AWas a method blank associated with every sample?Y N N/AWas the blank contaminated? If yes, please see gualification below.Blank extraction date: $\overline{5}/b7/h$  Blank analysis date: Y N NA Y N NA N NA

 $(\gamma q)$ 

A

Associated Samples:

z Conc. units:

Sample Identification s, 83 ₩-1/ Mb 200- 144 >5 Blank ID 62.7 アナト Compound

Blank analysis date:\_ Blank extraction date:\_

Sample Identification Associated Samples: Blank ID Compound Conc. units:

5x Phthalates 2x all others

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# VALIDATION FINDINGS WORKSHEET Field Blanks

ng. Page: 1 of 1 Reviewer: 10/

X N N/A       Were target compounds between in the new branks:         Blank units: $M$ Associated sample units: $M$ $M$ Sampling date:       4 $M$ Associated sample units: $M$ $M$ Field blank type:       (circle one) (Field Blank/ Rinsate / Other: $M$ $M$ $M$ $M$ Compound       Blank ID       Blank ID $M$ $M$ $M$ $M$ $M$
X N N/A     Weller       Blank units:     Wolf / Wolf       Sampling date:     A       Field blank type: (circ       Compound

A V Associated Samples:

			-				
	< F\$ )						
	(5 < /						
010- RZD							
FB-04072	2.2						
	123						CROL
	F3-0407-RZD 2010-RZD	EEF	EEE 2.2	FEE 2.2	EEE 2.2 KZD	FEE 2.2 FEE 2.2	FET 2.2 FET

units	
sample	
Associated	
lank units	
-	

Blank units: Ass	Associated sample units:_	ple units:	1					
Sampling date:		< / Rinsate / Other:		Associa	Associated Samples:			
					Samula Identification	ation		
Compound				_				
CROL								

5x Phthalates 2x All others

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### Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23308

**Chlorinated Pesticides** 



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 15, 2010

LDC Report Date: June 15, 2010

Matrix:

Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-2

Sample Identification

EB-04152010-RIG2-RZE

### Introduction

This data review covers 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.

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.

Sample FB-04132010-RIG2-RZE was identified as a field 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-04152010-RIG2-RZE	Col. 1 Col. 2	Decachlorobiphenyl Decachlorobiphenyl	55 (68-122) 57 (68-122)	All TCL compounds	J- (all detects) UJ (all non-detects)	Р

### 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. Although the LCS percent recovery (%R) was not within QC limits for one compound, the LCSD percent recovery (%R) was within QC limits and no data were qualified.

### 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 280-2500-2	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.

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### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

### Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2500-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-2	EB-04152010-RIG2-RZE	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Surrogate spikes (%R) (s)
280-2500-2	EB-04152010-RIG2-RZE	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

Tronox Northgate	Henderson
ALIDATION COMPLETEN	NESS WORKSHEET

Stage 2B

SDG #: 280-2500-2 Laboratory: Test America

LDC #: 23308A3a

Date: 6/14 /ro Page: lof / Reviewer: 574 2nd Reviewer: 0 2

-34

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

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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
	Validation Area	Â	A /
I.	Technical holding times	<u>A</u>	Sampling dates: 4/15/10
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	+
IV.	Continuing calibration/ICV	4	$Car / Iar = 25 \lambda$
V.	Blanks	Α	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec LCS/D
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	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	Ň	
XV.	Field blanks	ND	FA = 1

Note:

A = Acceptable N =-Not provided/applicable SW = See worksheet

Water

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

EB-04152010-RIG2-RZE	11	21	31	
MB280 - 11897 /2-A	12	22	32	
	13	23	33	
	14	24	34	
	15	25	35	
	16	26	36	
	17	27	37	
	18	28	38	
	19	29	39	
	20	30	40	
		EB-04152010-RIG2-RZE 11 INB 280 - 11897 /2-A 12 13 14 15 16 17 18 19	EB-04152010-RIG2-RZE       11       21         INB 280 - II897 /2-A       12       22         13       23         14       24         15       25         16       26         17       27         18       28         19       29	EB-04152010-RIG2-RZE       11       21       31         IMB 280 - II 897 /2-A       12       22       32         13       23       33         14       24       34         15       25       35         16       26       36         17       27       37         18       28       38         19       29       39

VALIDATION FINDINGS WORKSHEET

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

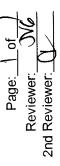
HC J. 4,4"-DDE BHC K. Endrin a-BHC L. Endosulfan II intor M. 4,4"-DDD		Z. Arocior-1248	
K. Endrin L. Endosulfan II M. 4,4'-DDD			Ĩ
L. Endosulfan II M. 4,4'-DDD		AA. Aroclor-1254	H.
shior M. 4,4'-DDD		BB. Aroclor-1260	JJ.
		CC. DB 608	KK.
F. Aldrin V. Aroclor-1016 V. Aroclor-1016	V. Aroclor-1016 DD.	DD. DB 1701	LL.
G. Heptachlor epoxide O. 4,4-DDT W. Aroclor-1221	W. Aroclor-1221 EE.		MM.
H. Endosulfan I P. Methoxychior X. Arocior-1232	X. Aroclor-1232 FF.		NN.

Notes:

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LDC #: >3308 A 39 SDG #: 54 Cm-V

# VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**



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

Y NNA V NNA

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	(st	Qualifications
			El.	A	) <u>22</u> (	(×2/-81)	J-/43/P (s)
			5		S7 (		
					)	(	
					)	(	
					)	(	
					)	(	
						(	
					)	(	
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					)	(	
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					)	(	
						](	
					)		
					)	] (	
	Letter Designation	Surrogate Compound	-	Recovery QC Limits (Soil)		Recovery QC Limits (Water)	ater) Comments

SUR.wpd

Tetrachoro-m-xylene Decachlorobiphenyl

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23308	Cer C
LDC #:	SDG #:

# VALIDATION FINDINGS WORKSHEET Laboratory Control Samples

Page: 1 of 2nd Reviewer: 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". V N/N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? V N/N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

eve <		ly Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?	every 20 sam	uples for each matrix (	or whenever a sample	e extraction was perfo	rmed?	
*	Date		Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS 280- 1897/5-A	-A U	33 (63-118)	( )	( br ) 56	AII	No guel
				( )	( )	(		( m JSD )
				( )	( )	( )		
				( )	( )	( )		
					( )	( )		
				( )	( )	(		
				( )	( )	( )		
				( )	( )	( )		
					( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				-	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

V:\Validation Worksheets\Pesticides\LCS.3S

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 22, 2010

LDC Report Date: June 15, 2010

Matrix:

Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-5

### Sample Identification

SSAM2-01-4BPC SSAM2-01-4BPCMS SSAM2-01-4BPCMSD

### 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 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
All samples in SDG 280-2771-5	All TCL compounds	19	14	J- (all detects) UJ (all non-detects)	P

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

### II. GC/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.

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) was identified as a field 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. Surrogate recoveries (%R) were not within QC limits for sample SSAM2-01-4BPC. Since the sample was diluted out, no data were qualified.

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within the QC limits. Since the samples were diluted out, 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**

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 280-2771-5	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, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2771-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2771-5	SSAM2-01-4BPC	All TCL compounds	J- (all detects) UJ (all non-detects)	Р	Technical holding times (h)
280-2771-5	SSAM2-01-4BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2771-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2771-5

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-2771-5

LDC #: 23308D3a

### Laboratory: Test America

### Isto Date: 6 Page: lof Reviewer: 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
١.	Technical holding times	Sh)	Sampling dates: $\frac{q}{r} \frac{1}{r} \frac{1}{10}$
11.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	7. KSD IV
IV.	Continuing calibration/ICV	A	$\frac{7. \text{ RSD}}{c \omega / \omega} = 20 \text{ B}$
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	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	Á	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB- 04 13 2010 - REG2 - RZE (280-240-2

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

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ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAM2-01-4BPC	11	21	31
2	SSAM2-01-4BPCMS	12	22	32
3	SSAM2-01-4BPCMSD	13	23	33
4	MB 280- 14906 /2-A	14	24	34
5	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	15	25	35
6		16	26	36
7		17	27	37
8		18	28	38
9		19	29	39
10		20	30	40

LDC #: 2330 8 D3A SDG #: Ja Come

### VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page:	1	_of_	)
Reviewer:		JV.	6
2nd Reviewer:		9	

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

METHOD : GC P	METHOD : GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)						
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysi <del>s</del> date	Total # of Days	Qualifier
All	S	N	4/22/10	5/11/10	5/13/10	19	J-/45/
					<b>'</b>		(h)
			·				
<u></u>							
						1	
						e.	

### **TECHNICAL HOLDING TIME CRITERIA**

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

LDC# 23308 D>4 3 ď SDG #:

# VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

NC Page: 1 of 1 Reviewer:\_ 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".

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

Qualifications	stude																	Comments
%R (Limits)	2 ( 27-115) No	)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	Recovery QC Limits (Water)
Surrogate Compound	A 1720	\$ 2																Recovery QC Limits (Soil)
Sample ID Column																		Surrogate Compound
# Date																		Letter Designation

Tetrachoro-m-xylene Decachlorobiphenyl m ∢

Dia	{
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m	1
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N	
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## VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: <u>of</u> <u>h</u> Reviewer: <u>7/6</u> 2nd Reviewer: <u>----</u>

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

Qualifications gual 2 V **Associated Samples**  

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

 NIA
 Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

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

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

 \_ ~  $\overline{}$ ~ ~ RPD (Limits) -~ ~ ~ ~ ~ ~ op a ulated MSD %R (Limits) \_  $\sim$ di lation  $\widehat{}$ - $\widehat{}$ ~ Het MS %R (Limits) 4 Ļ \_ -\_ 11 ts due Result Compound **DI DSW/SW** Kan 3 Ч Date Y N NA #

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### Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23308

Metals

### LDC

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

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

Collection Date: April 15 through April 16, 2010

LDC Report Date: June 21, 2010

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-2

### Sample Identification

EB-04152010-1-RZD EB-04152010-RIG2-RZE EB-04152010-1-RZDMS EB-04152010-1-RZDMSD

### Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, Magnesium, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. ICPMS Tune

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

### **III.** Calibration

An initial calibration was performed.

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

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No 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)	Cobalt Manganese	0.0113 ug/L 0.441 ug/L	All samples in SDG 280-2500-2

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-04152010-1-RZD	Manganese	0.84 ug/L	1.0U ug/L
EB-04152010-RIG2-RZE	Cobalt	0.16 ug/L	1.0U ug/L

Samples EB-04152010-1-RZD and EB-04152010-RIG2-RZE were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04152010-1-RZD	4/16/10	Manganese	0.84 ug/L	No associated samples in this SDG
EB-04152010-RIG2-RZE	4/15/10	Lead Cobalt Manganese Magnesium	0.18 ug/L 0.16 ug/L 9.4 ug/L 50 ug/L	No associated samples in this SDG

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

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

### VII. Duplicate Sample Analysis

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

### VIII. Laboratory Control Samples (LCS)

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

### IX. Internal Standards

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

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

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

### XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2500-2	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### XIII. Overall Assessment of Data

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

### XIV. Field Duplicates

No field duplicates were identified in this SDG.

### Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2500-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2500-2	EB-04152010-1-RZD EB-04152010-RIG2-RZE	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

### Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2500-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2500-2	EB-04152010-1-RZD	Manganese	1.0U ug/L	Α	bl
280-2500-2	EB-04152010-RIG2-RZE	Cobalt	1.0U ug/L	A	bl

### Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2500-2

### No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23308A4 SDG #: 280-2500-2

Laboratory: Test America

### Stage 2B

Date: 5/5/10 Page: fof / Reviewer: 2 2nd Reviewer: \_\_\_\_\_ 1.00

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### METHOD: Metals (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
1.	Technical holding times	A	Sampling dates: 4/15-16/10
11.	ICP/MS Tune	A	
III.	Calibration	À	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	msp
VII.	Duplicate Sample Analysis	$\mathbb{N}$	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	P.	
XIV.	Field Duplicates	N	
xv	Field Blanks	SW	EB=1, Z (no apporting Samples)

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:

	0001,0				
1	EB-04152010-1RZD	11	RBW	21	31
2	EB-04152010-RIG2-RZE	12		22	32
3	EB-04152010-1RZDMS	13		23	33
4	EB-04152010-1RZDMSD	14		24	34
5		15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:\_

LDC #:\_\_\_\_\_3308A4 SDG #: Storand

### VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_	1_of
Reviewer:	P
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All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb,(As,)Ba, Be, Cd, Ca, Cr,(Co)Cu, Fe, Pb, Mg,(Mn) Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
00:34		Al, Sb, (As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, (b, Mg, Mg) Hg, Ni, K, Se, Ag, Na, Ti, 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, Ti, 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, Ti, 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, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, 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, Ti, 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, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, 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 <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, 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, Ti, 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, Sl, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, 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, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
		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 Trace		Al, Sb, As, 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, 🔊 Ba, Be, Cd, Ca, Cr, Co Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
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:	Morou	ry by CVAA if performed

Comments: Mercury by CVAA if performed

ELEMENTS.4

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Page:																												CB CCB or PB concentration are listed above with the dentifications from the Validation Completeness Worksheet. These sample results	
Snd																								4				iness Worksh	
Хq																												on Complete	
(Reapont: bl	u u																											n the Validat	
(fear 11	Sample Identification																											tifications from	
	Sample																									-		with the den	
VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES eration factor applied:																												listed above	
VALIDATION FINDINGS WO PB/ICB/CCB QUALIFIED S Soil preparation factor applied: <u>A</u>																	-											entration are	
VALIDAT PB/ICB		2 ا						-			6/0	211																B or PB conc	5
শ	2										0.16					4/10	2											ated ICR_CC	
1 6010/7000 noted:	1000000	Blank Action Limit														122					 							s the associ	
LDC #: 23328AH SDG #: 23228AH METHOD: Trace Metas (EPA SW 846 Method 6010/7000) Sample Concentration units, unless otherwise noted: 4		Maximum E ICB/CCB <sup>a</sup> A (ug/L) 1							   										<u> </u>										AIG BEL 144 9 19
EPA SW units, unles		Maximum Ma PB <sup>*</sup> CI (uq/L) (									51100					141													samples wint analyte contraction within the antes the associated to contract of a contract and a second second "Un" within the associated to contract and the second se
23308AH Seccont D: Trace Metals (EF Concentration units		Maximum Ma PB <sup>a</sup> (mg/Kg)										5					2								<u> </u>				d as not dete
LDC #: C SDG #: C METHOD: T Sample Con		Analyte M	AI I	Sb Sb	As	Ba	Ba	3 2	3 2	3 0	5 6	3	3 6					2			Ad	P RN	F	: >	Zu	α	Ň	Sr	vere aualifie.

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		DD: Trace Metals (EPA <u>I/A</u> Were field blar <u>I/A</u> Were target ar <u>mits: un/l</u> <b>Associate</b>	SW846 hks ident halytes d	6010B/7000 diffied in this 5 detected in th	) SDG? e field blan a/Ka	ks?		Ē	eld Blank: (be				
	sampli ield b	ing date: 4/16/10 lank type: (circle one) l	Soil fa Field Bla	actor applied ank / Rinsate	100x / Other:	(EB)	Assoc	siated Sample	os: Noad	poc i at	0 Bang	Jes	
1       Action         0.84       Level         0.84       1         0.84       1         0.84       1         1       1	Analyte	Blank ID					Ø.	ample Identific	ation				
			Action Level										
	ЧЧ	0.84											

23308A4eb.wpd

EB-04152010-RIG2-RZE.wpd

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

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

Collection Date: April 15, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-8

### Sample Identification

SA165-3BPC SA131-6BPC SA131-8BPC\*\*

\*\*Indicates sample underwent Stage 4 review

### 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.

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-04152010-RIG2-RZE (from SDG 280-2500-2) was identified as an equipment blank. No arsenic was found in this blank.

Sample FB-04132010-RIG2-RZE (from SDG 280-2460-2) was identified as a field 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

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 was not performed for this SDG.

### 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 280-2500-8	All analytes reported below the PQL.	J (all detects)	A

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

### XIII. Overall Assessment of Data

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

### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

### Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2500-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2500-8	SA165-3BPC SA131-6BPC SA131-8BPC**	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2500-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2500-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2500-8

No Sample Data Qualified in this SDG

Tronox Northgate He	nderson
VALIDATION COMPLETENES	SS WORKSHEET
Stage 2B	14

LDC #: 23308B4 SDG #: 280-2500-8

Laboratory: Test America

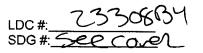
### Date: 6-15-10 Page: <u>1</u> of <u>/</u> Reviewer: <u>2</u> 2nd Reviewer: <u>\_\_\_\_</u>

### METHOD: As (EPA SW 846 Method 6020)

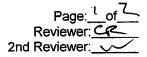
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation	Area					Comments		
I.	Technical holding times			A	Sampling	dates: 4/15/10	)		
١١.	ICP/MS Tune			A					
- 111.	Calibration			A					
IV.	Blanks			A					
V.	ICP Interference Check Sam	nple (IC	CS) Analysis	A					
VI.	Matrix Spike Analysis			N	Clier	it specifin	ed		
VII.	Duplicate Sample Analysis			N		V			
VIII.	Laboratory Control Samples	(LCS)		A	LCS				
IX.	Internal Standard (ICP-MS)			A					
<u> </u>	Furnace Atomic Absorption	QC		N	Noti	preformed reviewed s	- TAE WAYNE		
<u>XI.</u>	ICP Serial Dilution			N	NOT	pretor neo	)		
XII.	Sample Result Verification			A	Not	reviewed s	or ZB		
XIII.	Overall Assessment of Data			A				- 10	
XIV.	Field Duplicates			N					
XV	Field Blanks			ND	EB=E	B-04152010-RI	GA-RZE, T	-B=+B-04132010-RIGZ- (2560-2460-2)	72E
Note: Validate	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples:		R = Rin	o compound sate eld blank	s detected	C CSO-2500-2 D = Duplicat TB = Trip bla EB = Equipr	te ank	( <i>25</i> 0-2460-2)	
1	SA165-3BPC	11	RBS		21		31		
	SA131-6BPC	12			22		32		
3	SA131-8BPC **	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		

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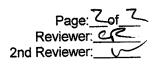


### Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
1 Technical holding mass and a second state of the second state of the second state of the second state of the	in de la			
All technical holding times were met.	$\leq$			
Cooler temperature criteria was met.				
II Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	$\square$	,		
Were %RSD of isotopes in the tuning solution < 5%?				
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 and 85-115% for cyanide) QC limits?		)		
Were all initial calibration correlation coefficients 2.995?				
III. Branks				
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.		1		
IX ICFI Internet Check Sample ***				
Were ICP interference check samples performed daily?	$\leq$			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV. Matrix spike/Wattix spike doplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		-		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.				
V Laboratory control samples				
Was an LCS anaylzed for this SDG?		· _		
Was an LCS analyzed per extraction batch?		<u> </u>		
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 FINDINGS CHECKLIST



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Validation Area	Yes	No	NA	Findings/Comments
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?				
VILICE SCHOOLING, March 2004 Constants				Carlo Marshall and Same
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	]			
Were all percent differences (%Ds) < 10%?			$\square$	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			-	
USED TO QUAINY THE DATA.				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?		-		
If the %Rs were outside the criteria, was a reanalysis performed?	<u>~</u>	-		
IX-Regional Quality Assurance and Quality Sontrols				
Were performance evaluation (PE) samples performed?		$\vdash$		
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Sample Resultive ancaudo	restation T		teating T	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	[	[		
XI: Overall assessment of data?				
Overall assessment of data was found to be acceptable.		1		
XII: Field dupic are				
Field duplicate pairs were identified in this SDG.	<u> </u>		<u>†</u>	
Target analytes were detected in the field duplicates.				
XIII-Field Markers				
Field blanks were identified in this SDG.	/	1	Ł	
Target analytes were detected in the field blanks.	_			



## VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Reviewer: Page: 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:

Found = concentration (in ug/L) of each analyte  $\underline{measured}$  in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source Where, %R = Found x 100 True

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						()
	GFAA (Initial calibration)						
	CVAA (initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICN	ICP/MS (Initial calibration)	Ας	4.8c	40,0	96	96	)
CCN (03:46)	ICP/MS (Continuing calibation)	٦	48.8	50.0	94	86	2-

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.

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LDC # 28908(34	34		VALIDATION FIN Level IV Recal	VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet			Page: of ) Reviewer: <u>CC</u> 2nd Reviewer: <u>(</u>
METHOD: Trace M	METHOD: Trace Metals (EPA SW 846 Method 6010/7000)	od 6010/7(	000				
Percent recoveries	Percent recoveries (%R) for an ICP interference check sam	nce check	sample, a laboratory cont	ple, a laboratory control sample and a matrix spike sample were recalculated using the following formula:	spike sample were r	ecatculated using th	e foliowing formula:
%R = <u>Found</u> × 100 True	Where, Found = Cono True	sentration of ( Found : Concen	Where, Found = Concentration of each analyte <u>measured</u> in the analysts of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). True = Concentration of each analyte in the source.	nalysis of the sample. For the r SR (sample result). burce.	matrix spike calculation,		
A sample and dupli	A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:	rence (RPI	D) was recalculated using	the following formula:			
RPD = <u> S-D </u> × 100 (S+D)/2	Where, S=C D=C	Original sam  Duplicate sar	<ul> <li>S = Original sample concentration</li> <li>D = Duplicate sample concentration</li> </ul>				
An ICP serial dilutic	An ICP serial dilution percent difference (%D) was recalculated using the following formula:	)) was rece	alculated using the followi	ng formula:			
%D = <u>II-SDR]</u> x 100 1	Where, I=In SDR = Serial D	nitial Sample Jilution Resu	Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)	(2)			
			Found/S/1 1	True / D / SDR <del>(units</del> )	Recalculated	Reported	Acceptable
Sample ID	Type of Analysis	Element		MAILS	%R / RPD / %D	%R / RPD / %D	(N/N)
1000	ICP interference check	B	100 2001	lough	100	IOO	)-
102	Laboratory control sample	A S	الا،ک	202	62	25	
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						
Comments: Refe	Comments: Refer to appropriate worksheet for list of qual	it for list of	qualifications and associ	iffications and associated samples when reported results do not agree within 10.0% of the recalculated results.	rted results do not a	<u>gree within 10.0% of</u>	the recalculated resutts.

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LDC #:\_23704 SDG #: Se

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	ι	_of
Reviewer:	$\cap$	2
2nd reviewer:		$\sim$

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

Y N N/A	have results been reported	ated range of the instruments and y		
Detected analyt following equati	e results for on:	As	were recalculated and verified using the	he

Concen	tration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:
RD	=	Raw data concentration	(13.75
FV	-	Final volume (ml)	
In. Vol.		Initial volume (ml) or weight (G)	
Dil	æ	Dilution factor	(~ 5
%S	=	Decimal percent solids	(O, (

 $\frac{5ugl/1000)(100mL)(5)}{896)(1.17g)} = 6.6mg/kg$ 

Sample ID	Analyte	Reported Concentration (MX FG )	Calculated Concentration ( M& / K.S. )	Acceptable (Y/N)
3	AS	6.6	(mg/Kg) 6,6	4
			·	
	·			
· ·				
			:	

RECALC.4S2

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

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

Collection Date: April 23, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-9

Sample Identification

SSAJ2-01-7BPC SSAJ2-01-9BPC\*\*

\*\*Indicates sample underwent Stage 4 review

### Introduction

This data review covers 2 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.

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 FB-04072010-RZD (from SDG 280-2216-2) was identified as a field 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

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 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 280-2836-9	All analytes reported below the PQL.	J (all detects)	А

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

### XIII. Overall Assessment of Data

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

### XIV. Field Duplicates

No field duplicates were identified in this SDG.

### Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2836-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2836-9	SSAJ2-01-7BPC SSAJ2-01-9BPC**	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2836-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2836-9

No Sample Data Qualified in this SDG

LDC #:	23308H4
SDG #:	280-2836-9
Laboratory	Test America

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B / U

Date: 6-15-16
Page: \of
Reviewer:
2nd Reviewer:

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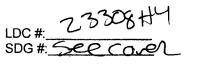
.

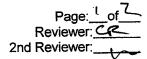
METHOD: As (EPA SW 846 Method 6020)

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
١.	Technical holding times	A	Sampling dates: 4/23/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analys	is A	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	N	L
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	<u>A</u>	
<b>X</b> .	Furnace Atomic Absorption QC	$\mathcal{N}$	Not reviewed for 2B
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for 20
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
xv	Field Blanks	NO	FB = FB - 04072010 - RZ0 (280 - 2216 - Z)
Note: Validate	N = Not provided/applicable R =	= No compound Rinsate = Field blank	is detected D = Duplicate TB = Trip blank EB = Equipment blank
1	SSAJ2-01-7BPC 11		21 31
+-	SSAJ2-01-9BPC ** 12		22 32
3	13		23 33
4	14		24 34
5	15		25 35
6	16		26 36
7	17		27 37
8	18		28 38
9.	19		29 39
10	20		30 40

Notes:\_\_\_\_\_





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

Validation Area	Yes	No	NA	Findings/Comments
1 Technical Indianana an a				
All technical holding times were met.	$\leq$	•		
Cooler temperature criteria was met.				
11 Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution < 5%?		_		
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 and 85-115% for cyanide) QC limits?				
Were all initial calibration correlation coefficients 0.995?				
UL BRAIKS				
Was a method blank associated with every sample in this SDG?	-	<u> </u>		
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		_		
IV-ICP Interference Check Sample				
Were ICP interference check samples performed daily?	$\leq$	°		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV Matrix spike/Matrix spike doplicates				A STORE CONTRACTOR OF A STORE
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		-		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			~	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			-	
V Laboratory control samples				
Was an LCS anaylzed for this SDG?		<u> </u>	ļ	
Was an LCS analyzed per extraction batch?			ļ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

LDC #: 23308#9 SDG #: Seecc arel

### VALIDATION FINDINGS CHECKLIST

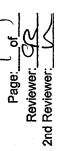
Page: Zof Z
Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VI. Eunacie domic Absorption Alc				
If MSA was performed, was the correlation coefficients > 0.995?			$\square$	
Do all applicable analysies have duplicate injections? (Level IV only)			$\square$	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)				
Were analytical spike recoveries within the 85-115% QC limits?				
VIL IGE Senate Cilcition				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?		/	<u> </u>	
Were all percent differences (%Ds) < 10%?				<b>)</b>
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				F
vin themailstandards (EPASSov 846 Michilito/6020). 1				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	/	<u> </u>		
If the %Rs were outside the criteria, was a reanalysis performed?				
IX-Regional Orang Assurance and Cuality control and				
Were performance evaluation (PE) samples performed?	<u> </u>	$\leq$	<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Sample Result Ventication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		†		
XI Overall assessment or datas				
Overall assessment of data was found to be acceptable.				
XII FIEIDEI DICHE RATE AND				State Contractor States Transition
Field duplicate pairs were identified in this SDG.		/	<u> </u>	
Target analytes were detected in the field duplicates.			/	Ĺ
Field blanks were identified in this SDG.	/	1		
Target analytes were detected in the field blanks.		/		

医外周网络网络网络网络网络马达马达马达马达马达马达马达马达马达马达马达马达



## VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification



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

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

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 %R = Found × 100 True

					Becalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	tCP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
FC	ICP/MS (Initial calibration)	AS	41.0	0,0H	103	201	) -
CCU63:3)	$O(\sigma_3, \gamma)$ ICP/MS (Continuing calibration)	1	0:19	50.0	201	201	)~

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 recelculated results.

CALCLC.4SW

LDC # 23308H4	4		VALIDATION FIN Level IV Recal	/ALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet		3	Page: of Reviewer: OC 2nd Reviewer: U
METHOD: Trace M	METHOD: Trace Metals (EPA SW 846 Method 6010/7000)	od 6010/70	(00)				
Percent recoveries	Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:	nce check :	sample, a laboratory con	trol sample and a matrix :	spike sample were r	ecalculated using th	e foliowing formula:
%R = <u>Found</u> × 100 True	Where, Found = Conc True	entration of ∈ Found = Conceni	Found = Concentration of each analyte <u>measured</u> 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.	malysis of the sample. For the r SR (sample result). ource.	matrix spike calculation,		
A sample and dupliv	A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:	rence (RPI	D) was recalculated usinç	g the following formula:			
RPD = <u>[S-D </u> x 100 (S+D)/2	Where, S=C	Original samp Duplicate san	S = Original sample concentration D = Duplicate sample concentration				
An ICP serial dilutic	An ICP serial dilution percent difference (%D) was recalculated using the following formula:	I) was reca	Itculated using the followi	ng formula:			
%D = <u>! -SDR]</u> x 100 1	Where, I=Ir SDR = Serial C	nitial Sample Mution Resul	Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)	< 5)			
					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
1C(AC)	ICP interference check	£	dd draft	100 mg/r	2001	8	}
577	Laboratory control sample		19.00	ZO. OMAK	95	R	) )
N	Matrix spike		(ssr-sr)				
1	Duplicate						
>	ICP serial dilution						
Comments: <u>Refe</u>	Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.	t for list of	qualifications and associ	lated samples when repor	rted results do not a	gree within 10.0% of	the recalculated results.

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TOTCLC.4SW

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	ι	_of_\
Reviewer:	$\mathcal{C}$	e
2nd reviewer:		

199

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

Y N N/A Are re	ns below for all questions answered "N". results been reported and calculated co sults within the calibrated range of the ir detection limits below the CRDL?	rrectiv?		
Detected analyte result following equation:	Its for		were recalculated and	l verified using the
FV = Final vol In. Vol. = Initial vo Dil = Dilution	L)(%S) Ita concentration Iume (mi) Viume (mi) or weight (G)	(0,928) (	(5) (100m) 1.12g)	)=32,8%
Sample ID	Analyte	Reported Concentration (M&  FG_)	Calculated Concentration	Acceptable (Y/N)
2	AS	32	37	Ŷ
				,
	· · · · · · · · · · · · · · · · · · ·			
	· · · · · · · · · · · · · · · · · · ·			
	·.			
			: 	

RECALC.4S2

# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 27, 2010

LDC Report Date: June 21, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-7

Sample Identification

SSAK8-04-4BPC

## 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.

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.

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field 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

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 was not performed for this SDG.

#### XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2960-7	All analytes reported below the PQL.	J (all detects)	Α

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, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2960-7

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2960-7	SSAK8-04-4BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2960-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2960-7

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSH

Stage 2B

SDG #: 280-2960-7 Laboratory: Test America

LDC #: 23308O4

#### 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: 4/27/10
.	ICP/MS Tune	A	
111.	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	L
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	N	NotuEilized
XI.	ICP Serial Dilution	N	Not presorred
XII.	Sample Result Verification	N	0
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NQ	FB= FB-04072010- RZD
			(280-2216-7)

Note: A = Acceptable

N = Not provided/applicable R = Rinsate SW = See worksheet

ND = No compounds detected FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated	Samples:	Soil	ļ
			1

1	SSAK8-04-4BPC	11	PBS	21	31	
2		12		22	32	
3		13		23	 33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	 40	

Notes:\_\_\_

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5-15-10

# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 28, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-1

#### Sample Identification

SSAN6-07-1BPC SSAN6-07-5BPC **RSAQ3-1BPC** RSAQ3-2BPC SA56-1BPC SA56-2BPC SA56-2BPC FD SA48-1BPC\*\* SA48-1BPC FD SA48-2BPC SA09-1BPC SA09-2BPC SA188-1BPC SA188-2BPC **RSAN6-1BPC RSAN6-2BPC** SSAN6-07-1BPCMS SSAN6-07-1BPCMSD RSAQ3-2BPCMS RSAQ3-2BPCMSD

\*\*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 6020 for Metals. The metals analyzed were 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 metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Manganese	0.829 ug/L	SA56-1 BPC SA56-2BPC SA56-2BPC_FD SA188-1BPC SA188-2BPC

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

Sample EB-04282010-RZB (from SDG 280-2995-2) was identified as an equipment blank. No metal contaminants were found in this blank.

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB04062010-RZB (from SDG 280-2131-1) were identified as field blanks. No metal contaminants were found in these blanks.

## 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 280-2995-1	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 SA56-2BPC and SA56-2BPC\_FD and samples SA48-1BPC\*\* and SA48-1BPC\_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentra	Concentration (mg/Kg)				
Compound	SA56-2BPC	SA56-2BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.4	3.3	3 (≤50)	-	-	-
Manganese	560	530	6 (≤50)	-	-	-

	Concentration (mg/Kg)					
Compound	SA48-1BPC**	SA48-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.3	3.4	3 (≤50)	-	-	-

## Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2995-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-1	SSAN6-07-1 BPC SSAN6-07-5BPC RSAQ3-1BPC RSAQ3-2BPC SA56-1BPC SA56-2BPC_FD SA48-1BPC_FD SA48-1BPC_FD SA48-2BPC SA09-1BPC SA09-2BPC SA188-1BPC SA188-2BPC RSAN6-1BPC RSAN6-2BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

LDC #: 23308P4

SDG #:

## Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B /나

280-2995-1

Laboratory: Test America

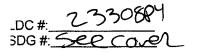
Date:<u>6-15-10</u> Page:<u>\_\_\_of /\_\_</u> Reviewer:<u>\_\_\_\_</u> 2nd Reviewer:\_\_\_\_\_ Ş

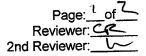
## METHOD: As & Mn (EPA SW 846 Method 6020)

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

	Validation	Area	L				Con	nments	
١.	Technical holding times			A	Sampli	ng d	lates: 4/2x/10		
.	ICP/MS Tune			A			, 0,		
.	Calibration			A					
IV.	Blanks			SW					
V.	ICP Interference Check Sar	nple (I	CS) Analysis	A					
VI.	Matrix Spike Analysis			A	ms	D	)		
VII.	Duplicate Sample Analysis			N					
VIII	Laboratory Control Samples	s (LCS	)	A	LCS	5_			
IX.	Internal Standard (ICP-MS)			A	_				
<u> </u>	Furnace Atomic Absorption	QC		$\overline{N}$	No	+0	itized		
XI.	ICP Serial Dilution		<u></u>	A					
XII.	Sample Result Verification			A	No	+ M	eviewed for	23	)
XIII.	Overall Assessment of Data	a		A					
XIV.	Field Duplicates	Sw			), (8,9)				
L x∨	Field Blanks	NO	FB:	: F	B-04072010 - RZC (Z50-2250 - 2)	FBOL	1062010-RZB		
Note: Validat	A = Acceptable N = Not provided/applicable SW = See worksheet	o compound sate eld blank	ls detecte	əd	( 250-2250 - 2) D = Duplicate TB = Trip blank EB = Equipment b	( Z Eq lank	-80-2131-1) 3= FBQ1281010 - RZB (280-2995-2)		
(ř	ted Samples: Soil	T	<u> </u>						
1	SSAN6-07-1BPC	11	SA09-1BPC		2	1	PBS	31	
2	SSAN6-07-5BPC	12	SA09-2BPC		2	2		32	
3	RSAQ3-1BPC	13	SA188-1BPC		2	3		33	
4	RSAQ3-2BPC	14	SA188-2BPC		2	4		34	
5	SA56-1BPC	15	RSAN6-1BPC	>	2	5		35	
6	SA56-2BPC	16	RSAN6-2BPC	2	2	6		36	·····
7	SA56-2BPC_FD	17	SSAN6-07-1E	BPCMS	2	7		37	· · · · · · · · · · · · · · · · · · ·
8	SA48-1BPC **	18	SSAN6-07-1E	BPCMSD	2	8		38	· · · · · · · · · · · · · · · · · · ·
9	SA48-1BPC_FD	19	RSAQ3-2BPC	CMS	2	9		39	
10	SA48-2BPC	20	RSAQ3-2BPC	CMSD	3	0		40	••••••••••••••••••••••••••••••••••••••

Notes:\_\_\_\_\_



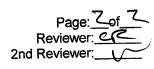


## No NA Findings/Comments Yes Validation Area All technical holding times were met. Cooler temperature criteria was met. II Calibration Were all isotopes in the tuning solution mass resolution within 0.1 amu? Were %RSD of isotopes in the tuning solution < 5%? Were all instruments calibrated daily, each 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 and 85-115% for cyanide) QC limits? **HIBER** 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. VstGE Interterence ChecksSample Were ICP interference check samples performed daily? Were the AB solution percent recoveries (%R) with the 80-120% QC limits? ValMatrix soike/Matrix solke duolicates Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and < 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 V Eaboratory control sample 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?

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

23308PY LDC #:\_\_\_ SDG #:\_\_\_ eecoel <

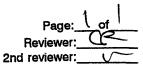
## VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
NERVICES ALL ON CONTRACTS AND A CARE OF A				
If MSA was performed, was the correlation coefficients > 0.995?				·····
Do all applicable analysies have duplicate injections? (Level IV only)			-	2
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			$\square$	<i>,</i>
Were analytical spike recoveries within the 85-115% OC limits?			1	
MILLIGE Senate UNition				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?	Ĺ	<u>_</u>	L	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
VIN The name and a rest set of a structure the control of the structure to a structure to structure to a structure to a structure to a struct				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	/	r		
If the %Rs were outside the criteria, was a reanalysis performed?				
IX Regional Quality Assummed and Quality Controls				
Were performance evaluation (PE) samples performed?	ļ		<b> </b>	
Were the performance evaluation (PE) samples within the acceptance limits?				1
x. Sample Result Venifeation Letters			T STATE	T
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI OVeral as estimated at the second state of				
Overall assessment of data was found to be acceptable.				
XII: Feld supercises				
Field duplicate pairs were identified in this SDG.		ļ	<b></b>	·
Target analytes were detected in the field duplicates.		1		
Field blanks were identified in this SDG.		1		
Target analytes were detected in the field blanks.				

LDC #: 233066 SDG #: SEO CO

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference



All circled elements are applicable to each sample.

Sample ID Matrix	Target Analyte List (TAL)
1-4,8-12,15,16	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',
57	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Ma, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
1314	Al, Sb, As, 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
CV: 17,18	Al, Sb (As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
19,20	Al, Sb, As, 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, Ti, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, 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, Ti, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni. K. Se. Ag. Na. Ti, V. Zn. Mo. B. Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, 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, Ti, 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, Ti, 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, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
	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 <sup>-</sup> ,
ICP Trace	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
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 <sup>-</sup> ,
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: Mercu	ry by CVAA if performed

Comments: Mercury by CVAA if performed

ELEMENTS.4

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Reviewer:																												AND an DB approximation are listed shows with the dentifications from the Validetion Completeness Worksheet. These sample results
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																												tion Complete
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5-7,3,14	Samale Identification																											tifications fro
MPLES ODX	Samal																											with the den
PB/ICB/CCB QUALIFIED SAMPLES aration factor applied: AT 10DX Associated Samples:		( an 7 Rd )																										isted above
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Method 6 herwise no		um Blank 28* Action												 			 							 				
A SW 846 unless ott		m Maximum iCB/CCB <sup>4</sup> (uo/L)														0 870	<u>}</u>											
LDC #: <u>14072005</u> SDG #: <u>14072005</u> METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Sample Concentration units, unless otherwise noted:		Maximum PB" (uo/L)			. 																							
D: Trace Metak		Maximum PB <sup>®</sup> (mo/Ka)																										
LDC #: SDG #: METHOI Sample (		Analyte	A	Sb Sb	As	Ba	Be	3	ۍ ت	ö	5	Ī		e d	Ma	e e	무	, Z		, es	Ag	R N N		: >	u Z	6	Ma	IJ

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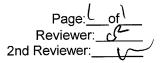
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Kara Ye

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LDC#: <u>23308P4</u> SDG#: <u>See Cover</u>

## VALIDATION FINDINGS WORKSHEET Field Duplicates



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

Y<u>N NA</u> YN NA Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentratio	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	6	7	RPD	Difference	Limits	(Parent Only)
Arsenic	3.4	3.3	3			
Manganese	560	530	6			

V:\FIELD DUPLICATES\FD\_inorganic\23308P4.wpd

	Concentra	tion (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	8	9	RPD	Difference	Limits	(Parent Only)
Arsenic	3.3	3.4	3			

LDC #: 233099'/ SDG #: 500000

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: \_\_\_\_\_of\_\_\_ Reviewer: \_\_\_\_\_\_ 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:

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source %R = Found × 100 True

					Receirculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICO	ICP/MS (Initial calibration)	AS		40,0		r K	Y
CU (Orios)	ICP/MS (Continuing calibation)	$\rightarrow$	8:6h	50.0			У

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.

CALCLC.4SW

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LDC # 232080%
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# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

50 Page: Reviewer:\_\_ 2nd Reviewer:

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

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

Found = Concentration of each analyte <u>measured</u> 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. Where, %R = Found × 100 True

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

 RPD = <u>15-D1</u> × 100
 Where, S = Original sample concentration

 (S+D)/2
 D = Duplicate sample concentration

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

%D = <u>II-SDR</u> × 100 Where

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found 1 S / 1 C	True / D / SDR (antes)	%R / RPD / %D	%R / RPD / %D	Acceptable (V/N)
TCSAD	ICP interference check	Ð	100181	100 mg/r	100	100	$\sum$
57	Laboratory control sample		12'61	20	96	H H	
1	Matrix spike		(ssrsr) А, р,	21.7	90	90	
17/14	Duplicate		h'22	842	2	2	
	CP serial dilution	$\rightarrow$	3,6	4.D	6.1	8,9	$\mathcal{V}$
Construction of the second							

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

TOTCLC.4SW

2 LDC #:\_ SDG #: Sec

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	L of
Reviewer:	CP
2nd reviewer:	F

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

Please s <u>ANN</u> YNN YNN	<u>I/A</u> Are	ve results neett tepo	librated range of the i	. Not applicable questio rrectly? nstruments and within th		
Detected following	d analyte re g equation:	esuits for	<u> </u>		were recalculated and	l verified using the
FV In. Vol. Dil	(in. = Raw = Fine = Initia = Dilu	<u>D)(FV)(Dil)</u> Vol.)(%S) I volume (ml) al volume (ml) al volume (ml) or weight ( tion factor imal percent solids	Recalco ( 3)	(0,942)	$\chi_{100m}$ =	3,3 mg/kc
s	ample ID		Analyte	Reported Concentration	Calculated Concentration	Acceptable (Y/N)
	\$	F	15	3,3	3,3	T
	**************************************					
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	<u> </u>				:	

RECALC.4S2

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date: June 16, 2010

Matrix: Water

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-2

## Sample Identification

EB04281010-RZB EB04281010-RZBMS EB04281010-RZBMSD

#### Introduction

This data review covers 3 water 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.

Sample EB04281010-RZB was identified as a field 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) were within QC limits.

## IX. Internal Standards

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

## XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-2	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

## Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2995-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-2	EB04281010-RZB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2995-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2995-2

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** 

23308Q4 280-2995-2

SDG #: Laboratory: Test America

LDC #:\_\_\_

## VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 6-15-10 Page: ( of) Reviewer: 2nd Reviewer:

#### 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: 4/28/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	mslp
VII.	Duplicate Sample Analysis	Ň	
VIII.	Laboratory Control Samples (LCS)	Á	LCS
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	`∧	Norueilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	$\gamma$	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	EB=1 (no appociated Samples)

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: DHER

1	EB04281010-RZB	11	REN	21		31	
2	EB04281010-RZBMS	12	- •	22		32	
3	EB04281010-RZBMSD	13		23	- 	33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

# Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-6

## Sample Identification

SSAN6-07-7BPC SSAN6-07-9BPC SSAN6-07-7BPCMS SSAN6-07-7BPCMSD

#### 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 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.

Sample FB-04072010-RZC (from SDG 280-2280-2) was identified as a field 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) were within QC limits.

## IX. Internal Standards

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

#### XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-6	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

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# Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2995-6

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-6	SSAN6-07-7BPC SSAN6-07-9BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2995-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2995-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: 23308S4 SDG #: 280-2995-6

# Laboratory: Test America

Date: 6-15-10 Page: <u>of</u> Reviewer: 2nd Reviewer: \_\_\_\_\_

#### 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
1.	Technical holding times	۵	Sampling dates: 4/28/10
11.	ICP/MS Tune	A	<u> </u>
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	No+ usivized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-04072010-RZC (250-2280-2)

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:

1	SSAN6-07-7BPC	11	PBS	21	31
2	SSAN6-07-9BPC	12		22	32
3	SSAN6-07-7BPCMS	13		23	33
4	SSAN6-07-7BPCMSD	14		24	34
5		15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

#### Notes:

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 30, 2010

LDC Report Date: June 16, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3100-1

# Sample Identification

SSAK7-05-5BPC SSAK7-05-1BPC SSAK7-05-1BPC\_FD SSAQ5-01-5BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD SSAK7-05-5BPCMS SSAK7-05-5BPCMSD

# Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for 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.

Samples FB0406010-RZB (from SDG 280-2131-1) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No arsenic was found in these blanks.

# 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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3100-1	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

# XIII. Overall Assessment of Data

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

# XIV. Field Duplicates

Samples SSAK7-05-1BPC and SSAK7-05-1BPC\_FD and samples SSAQ5-01-1BPC and SSAQ5-01-1BPC-FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)					
Compound	SSAK7-05-1BPC	SSAK7-05-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.0	3.3	10 (≤50)	-	-	-

	Concentration (mg/Kg)		Concentration (mg/Kg)			Diff		
Compound	SSAQ5-01-1BPC	SSAQ5-01-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P		
Arsenic	14	24	53 (≤50)	-	J (all detects)	A		

# Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-3100-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3100-1	SSAK7-05-5BPC SSAK7-05-1BPC SSAK7-05-1BPC_FD SSAQ5-01-5BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-3100-1	SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	Arsenic	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

# Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-3100-1 Laboratory: Test America

LDC #: 23308X4

# Date 6-15-10 Page: Lof | Reviewer: C/Z 2nd Reviewer:

# 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: 4/30/10
II.	ICP/MS Tune	A	
.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	mslp
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	Les
IX.	Internal Standard (ICP-MS)	Â	
Χ.	Furnace Atomic Absorption QC	N	NOTUEIlizen
XI.	ICP Serial Dilution	Pr	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3), (5,6)
xv	Field Blanks	\$NO	FB= FB0406010-RZB, FB-04072010-RZD
Note:	A = Acceptable ND = N	lo compound	(280.2131-1) $(280.7716-7)$

Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

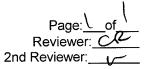
Validated Samples: So!

1	SSAK7-05-5BPC	11	PBS	21	 31	
2	SSAK7-05-1BPC	12		22	 32	
3	SSAK7-05-1BPC_FD	13		23	33	
4	SSAQ5-01-5BPC	14		24	34	
5	SSAQ5-01-1BPC	15		25	35	
6	SSAQ5-01-1BPC-FD	16		26	36	
7	SSAK7-05-5BPCMS	17		27	37	
8	SSAK7-05-5BPCMSD	18		28	38	
9		19		29	39	
10		20		30	40	

Notes:

LDC#: <u>23308X4</u> SDG#: <u>See Cover</u>

# VALIDATION FINDINGS WORKSHEET Field Duplicates



2

METHOD: Metals (EPA Method 6020/7000)

<u>X N NA</u> Y<u>N NA</u> Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	2	3	RPD	Difference	Limits	(Parent Only)
Arsenic	3.0	3.3	10			

V:\FIELD DUPLICATES\FD\_inorganic\23308X4.wpd

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	5	6	RPD	Difference	Limits	(Parent Only)	
Arsenic	14	24	53			Jdet/A (fd)	

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23308

Perchlorate

# Laboratory Data Consultants, Inc. Data Validation Report

SSAM4-02-2BPCMS SSAM4-02-2BPCMSD

SSAM4-02-2BPCDUP

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

Collection Date: April 15, 2010

LDC Report Date: June 15, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-2

# Sample Identification

SA129-4BPC SA129-6BPC SA129-8BPC SA129-9BPC\*\* SSAM5-02-2BPC SSAM5-02-4BPC SSAM5-02-6BPC\*\* SSAM5-02-8BPC SSAM5-02-10BPC SSAM5-02-6BPC FD SSAM4-02-2BPC\*\* SSAM4-02-4BPC SSAM4-02-6BPC SSAM4-02-8BPC SSAM4-02-10BPC SSAN4-01-2BPC SSAN4-01-4BPC SSAN4-01-8BPC SSAN4-01-8BPC SSAN4-01-10BPC

\*\*Indicates sample underwent Stage 4 review

# Introduction

This data review covers 22 soil samples 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.

Samples FB-04132010-RIG2-RZE (from SDG 280-2400-2) and FB-04072010-RZC (from SDG 280-2280-2) were identified as field blanks. No perchlorate were found in these blanks.

# IV. Matrix Spike/Matrix Spike Duplicates

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

# V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

# VI. Laboratory Control Samples

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

# VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2500-2	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 SSAM5-02-6BPC\*\* and SSAM5-02-6BPC\_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/Kg)		5		
Analyte	SSAM5-02-6BPC**	SSAM5-02-6BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	440	520	17 (≤50)	-	-	-

# Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2500-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2500-2	SA129-4BPC SA129-6BPC SA129-8BPC SA129-9BPC** SSAM5-02-2BPC SSAM5-02-4BPC SSAM5-02-6BPC** SSAM5-02-6BPC SSAM5-02-6BPC SSAM4-02-2BPC** SSAM4-02-6BPC SSAM4-02-6BPC SSAM4-02-6BPC SSAM4-02-6BPC SSAM4-02-10BPC SSAM4-01-2BPC SSAN4-01-2BPC SSAN4-01-8BPC SSAN4-01-8BPC SSAN4-01-10BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2500-2

No Sample Data Qualified in this SDG

LDC #: 23308A6

#### SDG #: 280-2500-2 Laboratory: Test America

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B / U

Date: 6-15-10
Page:of
Reviewer: CR
2nd Reviewer:

# METHOD: (Analyte) Perchlorate (EPA Method 314.0)

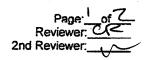
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation	Area						Comr	nents	
1.	Technical holding times			A	Samp	ling d	ates: 4/	15/10	)	
IIa.	Initial calibration			A			-			
llb.	Calibration verification			A						
111.	Blanks			A						
IV	Matrix Spike/Matrix Spike D	uplicat	es	A	m	<u>5/</u>				
V	Duplicates			A	Q	R				
VI.	Laboratory control samples			A	LC	Ś	D			
VII.	Sample result verification		<u>.</u>	A						
VIII.	Overall assessment of data			A						
IX.	Field duplicates			Sw_	107	151	<u>0)</u>			
L_X_	Field_blanks			ND	FB	= F1	<u>B-641320</u>	10-RIGD.	-RZE	-, FB-04072010-BZC (280-2280-7.)
Note: Valida	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples:		R = Rin	o compound sate eld blank	s detec	ted	TB = 1	uplicate Trip blank Equipment bla	ńk	,
1	SA129-4BPC	11	SSAM4-02-28	<sub>BPC</sub> <b>* *</b>		21	SSAM4-02-2	BPCMS	31	
2	SA129-6BPC	12	SSAM4-02-48			22	SSAM4-02-2	BPCMSD	32	
3	SA129-8BPC	13	SSAM4-02-68	3PC		23	L	DUP	33	
4	SA129-9BPC **	14	SSAM4-02-8	3PC		24			34	
5	SSAM5-02-2BPC	15	SSAM4-02-10	DBPC		25			35	
6	SSAM5-02-4BPC	16	SSAN4-01-2E	3PC		26			36	
7	SSAM5-02-6BPC	17	SSAN4-01-4E	3PC		27			37	
8	SSAM5-02-8BPC	18	SSAN4-01-8E	BPC		28			38	
9	SSAM5-02-10BPC	19	SSAN4-01-8E	BPC		29			39	
10	SSAM5-02-6BPC_FD	20	SSAN4-01-10	BPC		30			40	

Notes:\_\_\_\_\_

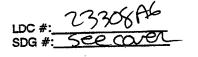
N LDC #\_\_\_\_\_\_SDG #\_\_\_\_CQ

# VALIDATION FINDINGS CHECKLIST

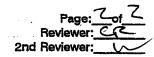


Validation Area	Yes	No	NA	Findings/Comments
	1			
All technical holding times were met.				
Cooler temperature criteria was met.		1		
Were all instruments calibrated daily, each set-up time?	1	1		
Were the proper number of standards used?	1			
Were all initial calibration correlation coefficients > 0.995?	/	1		
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)				1
Was a method blank associated with every sample in this SDG?	$\leq$			·
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.			Ĺ	
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.	/	ŕ		- -
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.	<u>\</u> .			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	4	-		
Was an LCS anayized for this SDG?	$\langle \rangle$			
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?	1			
VI. Genome and Associate and Quality Canadi Lie				
Were performance evaluation (PE) samples performed?		/	- ]	/
Were the performance evaluation (PF) samples within the accentance limits?			1	

# Method: Inorganics (EPA Method Sectore

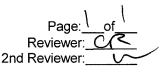


# VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
VII Semple Result Ventositor				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	-	-		
Were detection limits < RL?		<u>k</u>		
VIII: Overell'ansessione/#.ck.date	<u>.</u>			A CONTRACTOR OF
Overall assessment of data was found to be acceptable.	/	Í		
(X. Field duplicates				
Field duplicate pairs were identified in this SDG.	//	<b>•</b> _		
Target analytes were detected in the field duplicates.		·		
Y Field blacks				
Field blanks were identified in this SDG.		ſ		· · · · · · · · · · · · · · · · · · ·
Target analytes were detected in the field blanks.		/		

# VALIDATION FINDINGS WORKSHEET Field Duplicates



Inorganics, Method: See Cover

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

	Concentrati	on (mg/Kg)				Qualification
Analyte	7	10	RPD (≤50)	Difference	Limits	(Parent only)
Perchlorate	440	520	17			

V:\FIELD DUPLICATES\FD\_inorganic\23308A6.wpd

	, ID	Initial and Cor	validadin Fl itinuing Cal	validatin Findings worksneet ontinuing Calibration Calculation Verification	leet lation Verifica	ation	Page: of Reviewer: C
Method: Inorganics, Method <u> </u>	ethod	34 .U ation of ClOy		was recalculated.Calibration date: $\mathcal{A}/\mathcal{U}/10$	date: 4/21/1(	0	
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:	oration verificat	tion percent rec	overy (%R) was	s recalculated for e	ach type of analys	is using the follo	wing formula:
%R = <u>Found X 100</u> True		Where,	Found = conce True = conce	= concentration of each analyte <u>measured</u> in the analysis = concentration of each analyte in the ICV or CCV source	lalyte <u>measured</u> ir lalyte in the ICV ol	t the analysis of t r CCV source	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration of each analyte in the ICV or CCV source
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r <sup>2</sup>	Reported r or r <sup>2</sup>	Acceptable (Y/N)
Initial calibration		s1	~	0.0025			
		s2	2.5	0.00841	0.998765	0.998771	
	< -	s3	2	0.01661			)
	00	s4	10	0.03291			_
		s5	20	0.06345			•
		s6	40	0.14097			
Calibration verification		ICU	02	18,800	hb	I	
Calibration verification		CCV	8	28,260	44		
Calibration verification	$\rightarrow$	CCV	01	01-6:01	60I	]	$\rightarrow$
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.	ation Verificatic scults.	n findings worl	sheet for list o	f qualifications and	l associated samp	oles when reporte	d results do not agree w

LDC #: 2330000

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

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Page: Reviewer: 2nd Reviewer:

METHOD: inorganics, Method Secover

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

concentration of each analyte measured in the analysis of the sample. For the matrix sulke calculation	Found = SSR (spiked sample result) - SR (sample result).	concentration of each analyte in the source.
Found =		True ==
Where,		
%R = <u>Found</u> x 100	rue	

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

	Original sample concentration Duplicate sample concentration	
•	။ ။ ວິດ	
•	Where,	
	x 100	
	$RPD = \frac{13-D1}{(S+D)/2}$	

-				1			
-					Recalculated	Reported	
Sample ID	Type of Analysis	Element	(unites)	(entra)	0 dH / HPD	%R / RPD	Acceptable (Y/N)
	Laboratory control sample						
102		Cloy	0,107	LO1 8 660,0	. 201	107	)-
	Matrix spike sample		(ssr-sr)				
2			OHO OHO	929			
	Dimbata annula						
22			(25)	202		1	
>		>	-			J	$\rightarrow$

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.

TOTCLC.6

LDC SDG

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	Lot
Reviewer:	Ce-
2nd reviewer:	

reported with a positive detect were

(1000)(10)

: 230mg/kg

METHOD: inorganics, Method

SECON

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Have results been reported and calculated correctly? <u>Y N N/A</u>

YN N/A Y) N N/A Are results within the calibrated range of the instruments? Are all detection limits below the CRQL?

Compound (analyte) results for recalculated and verified using the following equation:

0.06901 Recalculation Concentration = +0,0008 Area-Offset Propfactor (DF) 1000 0,00 Slope % solid (0.896)

#	Sample ID	Analyte	Reported Concentration (MS/KS)	Calculated Concentration ( Mg (G)	Acceptable (Y/N)
	4	. CIQ4	230	230	Y
		,			
		· ·			
				· · · · · · · · · · · · · · · · · · ·	
	l				
		· .			
			<u></u>		
<b> </b>					
L		<u> </u>		L	L

Note:

RECALC.6

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 26, 2010

LDC Report Date: June 15, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-7

# Sample Identification

SSAR6-04-7BPC SSAR6-04-9BPC

V:\LOGIN\TRONOXNG\23308J6.TR3

#### Introduction

This data review covers 2 soil samples 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.

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 FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No perchlorate was found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All samples in SDG 280-2879-7

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

# IV. Matrix Spike/Matrix Spike Duplicates

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.

# V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

# **VI. Laboratory Control Samples**

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

# VII. Sample Result Verification 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 280-2879-7	All analytes reported below the PQL.	J (all detects)	А

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

# VIII. Overall Assessment

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

# **IX. Field Duplicates**

No field duplicates were identified in this SDG.

# Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2879-7

SDG	SDG Sample		Flag	A or P	Reason (Code)
280-2879-7	SSAR6-04-7BPC SSAR6-04-9BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2879-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2879-7

No Sample Data Qualified in this SDG

LDC #:<u>23308J6</u> SDG #:<u>280-2879-7</u> Laboratory:<u>Test America</u>

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6-15-10 Page: 1 of 1 Reviewer: 7 2nd Reviewer: 7

# 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: 4126110
Ila.	Initial calibration	A (A	
lib.	Calibration verification	P	
- 111.	Blanks	Ŕ	
IV	Matrix Spike/Matrix Spike Duplicates		Client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCSD
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	$\sim$	
	Field blanks	SW	FB = FB04062010-RZB (280-2131-2)
Note:	A = Acceptable	ND = No compounds	$\begin{array}{c} C^{2} & C^{3} & C^{3} & C^{3} \\ \text{s detected} & D = Duplicate \end{array}$

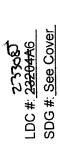
A = Acceptable N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

# Validated Samples:

	<u> </u>					
1	SSAR6-04-7BPC	11 P	BS	21	31	
2	SSAR6-04-9BPC	12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:\_



# VALIDATION FINDINGS WORKSHEET Field Blanks

ð Page:

Ivre         Blanktb         Action Limit         Sample Identification           FB04062010-RZB         NO(のして)         人口(のして)         Sample Identification           92         9.2         9.2         9.2         9.2		Action Limit	sampling date: <u>4/6/10</u> Sort applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: AV	Y N N/A Were field blanks identified in this SDG? Y N N/A Were target analytes detected in the field blanks? Mank units: ug/L Associated sample units: mg/Kg
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# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 26, 2010

LDC Report Date: June 15, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-8

# Sample Identification

SSAR6-04-10BPC SSAR6-04-10BPCMS SSAR6-04-10BPCMSD SSAR6-04-10BPCDUP

# Introduction

This data review covers 4 soil samples 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.

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 FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No perchlorate was found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All samples in SDG 280-2879-8

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

# **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 280-2879-8	All analytes reported below the PQL.	J (all detects)	A

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

### **VIII. Overall Assessment**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.

# Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2879-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)	
280-2879-8	SSAR6-04-10BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2879-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2879-8

No Sample Data Qualified in this SDG

LDC #:_	23308K6
SDG #:	280-2879-8
Laborato	ory: Test America

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6-15-0 Page: 0 of 1 Reviewer: 4 2nd Reviewer: 7

### 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.

	Validatio	n Area					Comments	
I.	Technical holding times			A	Sampling d	ates: 4/2		
Ila.	Initial calibration			Ŕ				
Ilb.	Calibration verification			A				
.	Blanks			A		L		
IV	Matrix Spike/Matrix Spike	Duplicate	es	A	ms/	$\mathcal{D}$		
V	Duplicates			A	Oup			
VI.	Laboratory control sample	S		A	LCSI	D		
VII.	Sample result verification			N			····	
VIII	. Overall assessment of da	ta	<u></u>	P/				
IX.	Field duplicates			$N_{\rm c}$				an a
L_X_	Field blanks			SW	FB =	FB04062	<u>010-RZB</u>	)
Note: Valida	A = Acceptable N = Not provided/applicat SW = See worksheet ted Samples:	ble	R = Rin	o compound sate eld blank	s detected	( 280-24 D = Dup TB = Trij EB = Eq	31-2) licate p blank uipment blank	
[	<u> </u>		00 (		<u> </u>	I	<u></u>	
1	SSAR6-04-10BPC	11	PBS		21		31	
2	SSAR6-04-10BPCMS	12			22		32	
3	SSAR6-04-10BPCMSD	13		<del> </del>	23		33	
4	SSAR6-04-10BPCDUP	14			24		34	
5		15			25		35	
6		16			26		36	
7		17			27		37	
8		18			28		38	
9		19			29		39	

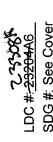
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Notes:

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# VALIDATION FINDINGS WORKSHEET Field Blanks

Page: <sup>1</sup> of <sup>1</sup> Reviewer: <u>C/S</u> 2nd Reviewer: <u>K</u>

000 ±. 000 0000				
METHOD: Inorgani <u>Y N N/A</u> We <u>Y N N/A</u> We	METHOD:         Inorganics, EPA Method         See Cover           Y         N/A         Were field blanks identified in this SDG?           Y         N/A         Were target analytes detected in the field blanks?	Cover ed in this SDG ected in the fie	37 ald blanks?	
: ug/l	Associated sample units: mg/Kg	units: mg/Ko	g Reason Code: bf	
Sampling date: 4/6 Field blank type: (c	110 ircle one	Soil factor applied 10x ield Blank / Rinsate / Oth	ther: 2 Associated Samples: A	
Analyte	Blank ID	Action Limit		Sample Identification
	FB04062010-RZB (SDG#: 280-2131- <b>没</b> )		No duals	
CIO4	92	9.2		

1 2000 Content

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 28, 2010

LDC Report Date: June 15, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-1

### Sample Identification

SSAN6-07-1BPC SSAN6-07-5BPC SSAN6-07-1BPCMS SSAN6-07-1BPCMSD SSAN6-07-1BPCDUP

### Introduction

This data review covers 5 soil samples 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.

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 FB-04072010-RZC (from SDG 280-2280-2) was identified as a field 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 280-2995-1	All analytes reported below the PQL.	J (all detects)	A

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

# VIII. Overall Assessment

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

# **IX. Field Duplicates**

No field duplicates were identified in this SDG.

### Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2995-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-1	SSAN6-07-1BPC SSAN6-07-5BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2995-1

No Sample Data Qualified in this SDG

LDC #: 23308P6 SDG #: 280-2995-1

# **Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Page: <u>of</u> Reviewer: 2nd Reviewer:

Date: G-15-0

Laboratory: Test America

### 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
<u>і.</u>	Technical holding times	A	Sampling dates: 4/28/10
lla.	Initial calibration	A	
llb.	Calibration verification	A	
HI.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	Die
VI.	Laboratory control samples	A	LCSD
VII.	Sample result verification	N	
´VⅢ.	Overall assessment of data	A	
IX.	Field duplicates	$\sim$	
x	Field blanks	NO	FB = FB - 04072010 - BZC (280-2280-2)
			(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:	50:1
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1	SSAN6-07-1BPC	11	21	31	
2	SSAN6-07-5BPC	12	22	32	
3	SSAN6-07-1BPCMS	13	23	33	
4	SSAN6-07-1BPCMSD	14	24	34	
5	SSAN6-07-1BPCDUP	15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:

# Laboratory Data Consultants, Inc. Data Validation Report

1

**Project/Site Name:** 

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 30, 2010

Soil

LDC Report Date: June 15, 2010

Matrix:

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3100-1

Sample Identification

SSAQ5-01-5BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD

V:\LOGIN\TRONOXNG\23308X6.TR3

### Introduction

This data review covers 3 soil samples 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.

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 FB04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No perchlorate was found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All samples in SDG 280-3100-1

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

### **IV. Matrix Spike/Matrix Spike Duplicates**

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.

### V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

### **VI. Laboratory Control Samples**

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

### **VII. Sample Result Verification 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 280-3100-1	All analytes reported below the PQL.	J (all detects)	А

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 SSAQ5-01-1BPC and SSAQ5-01-1BPC-FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)		000	D!#		
Analyte	SSAQ5-01-1BPC	SSAQ5-01-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	210	190	10 (≤50)	-	-	-

# Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-3100-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3100-1	SSAQ5-01-5BPC SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-3100-1

No Sample Data Qualified in this SDG

LDC #:_	23308X6					
SDG #:	280-3100-1					
Laboratory: Test America						

# **Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6-16-10
Page: <u></u> of
Reviewer: 07
2nd Reviewer:

### 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
<b> </b> .	Technical holding times	A	Sampling dates: 4130/10
lla.	Initial calibration	A	
llb.	Calibration verification	A	
	Blanks	A	· · · · · · · · · · · · · · · · · · ·
IV	Matrix Spike/Matrix Spike Duplicates	N.	Client specified
V	Duplicates	N	d -
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(2,3)
L x	Field blanks	SW	FB= FB04062010-RZB (280-2131-2)
			(280 - 2131 - 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	SSAQ5-01-5BPC	11	PBS	21	31
2	SSAQ5-01-1BPC	12		22	32
3	SSAQ5-01-1BPC-FD	13		23	33
4		14		24	34
5		15		25	35
6		16		26	36
7		17	· · · · · · · · · · · · · · · · · · ·	27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:

LDC #: <u>23308X6</u> SDG #: <u>See Cover</u>

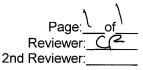
# VALIDATION FINDINGS WORKSHEET Field Blanks

Page: / of / Reviewer: <u>CZ</u> 2nd Reviewer: <u>/ / </u>

METHOD: Inorganics, EP <u>Y N N/A</u> Were field <u>Were targ</u> Blank units: <u>ug/L</u> Asso Sampling date: <u>4/6/10</u>	METHOD: Inorganics, EPA MethodSee CoverY)NN/AWere field blanks identified in this SDG?YNN/AVNere target analytes detected in the field blanks?Blank units: ug/LAssociated sample units: mg/KgSampling date:4/6/10	hod <u>See Cover</u> ks identified in this SDG? alytes detected in the field <b>d sample units: <u>mg/Kg</u></b>	? Id blanks?	Reason Code: bf
Field blank type: (	Field blank type: (circle one)(Field Blank / Rinsate / Other:	/ Rinsate / Ot	her:	Associated Samples: All
Analyte	Blank ID	Action Limit		Sample I
	FB04062010-RZB (SDG#: 280-2131-20)		No Qualifiers	
CIO4	92	9.2		

Sample Identification

### VALIDATION FINDINGS WORKSHEET Field Duplicates



Inorganics, Method: See Cover

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

	Concentrati	on (mg/Kg)		1		
Analyte	2	3	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	210	190	10			

V:\FIELD DUPLICATES\FD\_inorganic\23308X6.wpd