

**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.

June 30, 2010

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

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

**Data Validation** 

Dear Ms. Arnold,

Enclosed are revised data validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

#### **LDC Project # 23308:**

SDG#	<u>Fraction</u>
280-2500-2	Perchlorate
280-2699-5, 280-2995-1	Semivolatiles
280-2995-2	Arsenic

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

Sincerely,

Erlinda T. Rauto

Operations Manager/Senior Chemist



#### LABORATORY DATA CONSULTANTS, INC.

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

Northgate Environmental Management, Inc.

June 22, 2010

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

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:**

#### SDG#

#### 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,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

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Attachment 1

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EDD CHECKLIST

Page: 1\_of 1 Reviewer: JE 2nd Reviewer: BC

LDC #: 23308 SDG #: <u>280-2500-2</u>, <u>280-2500-8</u>, <u>280-2699-5</u>, <u>280-2771-5</u> 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	T		Γ	
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?		Х		
If yes, were they corrected or documented for the client?			Х	See EDD_discrepancy_ form_LDC23308_062210.doc
IV. EDD Delivery	1	1	T	
Was the final EDD sent to the client?	X			

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

Semivolatiles



### 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)	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 280-2500-2

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

23308A2a Stage 2B SDG #: 280-2500-2

Date:	6 KA M
Page:	l of )
Reviewer:	V/G
2nd Reviewer:	4

Laboratory: Test America 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.

	N. I. I. Care Array		Comments
	Validation Area		
1.	Technical holding times	A	Sampling dates: 4 /16 /to
II.	GC/MS Instrument performance check	A	
III.	Initial calibration		2 KSD Y~ CEV /CV £25 B
IV.	Continuing calibration/ICV	A	CEV / CV C 25 3
V.	Blanks	<u> </u>	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	US/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	<u> </u>	
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	EB = 1

Note:

LDC #:\_\_\_

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water

	VV N(-1 C 1		 			
1	EB-04152010-1RZD	11	21		31	
	MB 280-11 838 /- A	12	22		32	
3		13	23		33	
4		14	24		34	
		15	25		35	
5		16	26		36	
6		17	27		37	
/		18	28		38	
8		19	29		39	
9			30		40	
10		20	<u> </u>	<u> </u>		

### 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 29, 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
SSAK7-01-9BPC	Bis(2-ethylhexyl)phthalate	73 ug/Kg	73U ug/Kg
SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg

<sup>\*</sup>Corrected sample ID in table above.

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)	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 280-2699-5

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)	А	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	SSAK7-01-9BPC	Bis(2-ethylhexyl)phthalate	73U ug/Kg	А	bl
280-2699-5	SSAK7-01-10BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	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** IDATION COMPLETENESS WORKSHEET

DC #:	23308C2a	VALIDATION	COMI ELITA
	280-2699-5		Stage 2B
SUG #	200-2000-0		
aborato	rv: Test Americ	3	

Page: 1 of Reviewer:\_ 2nd Reviewer:

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.

T	Validation Area		Comments
	Technical holding times	A	Sampling dates: 4/21/16
<u> </u>	GC/MS Instrument performance check	À	
111.	Initial calibration	<u>A</u>	2 RSD +2 COV/10 4253
IV.	Continuing calibration/ICV	<u> </u>	COV/1W & 26 B
V.	Blanks	<u>SN</u>	
VI.	Surrogate spikes	A	ch + c
VII.	Matrix spike/Matrix spike duplicates	<u> </u>	US Spec
VIII.	Laboratory control samples	A	us .
IX.	Regional Quality Assurance and Quality Control	<u>N</u>	
Χ.	Internal standards	<u>A</u>	
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	. 1)	## ( 200 // ) ]
XVII.	Field blanks	SW	FB = FB-04072010_ RZD (280-22/6-2)

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:

	201				
1	SSAK7-01-9BPC	11	MB 280-1291/1-A	21	31
	SSAK7-01-10BPC	12		22	32
2	SSAK7-01-10BFC	13		23	33
3		14		24	34
4		15		25	35
5				26	36
6		16		27	37
7		17		28	38
8		18		29	39
9		19		30	40
10		20		130 1	

# 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-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)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroanlline	II. 4-Nitrophenoi*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichiorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluens	ZZ. Pyrane	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methyinaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
i. 4-Methylphenol	X, Hexachlorocyclopentadiene*	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. 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**	חחח
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# 73308 C24

# VALIDATION FINDINGS WORKSHEET

Page: lof 1 2nd Reviewer: Reviewer:\_

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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? Was a method blank associated with every sample?

V N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date:  $\frac{4}{28}$ /h Blank analysis date:  $\frac{4}{32}$ /h 

10 /cc Conc. units:

Compound

(44) Sample Identification Associated Samples: 20 2 Mb 280- 13911 Blank 1D 62.7 EEF

Blank analysis date:	Ì
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Blank extraction date:	Conc. units:
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Associated Samples:

Sample Identification Blank ID Compound

5x Phthalates 2x all others

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# VALIDATION FINDINGS WORKSHEET

Field Blanks

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Page:	Reviewer:	2nd Reviewer:

Sample Identification Associated Samples: <u>1</u>2 XG Were target compounds detected in the field blanks? Blank units: W/L Associated sample units: U5/L8 Field blank type: (circle one) Field Blank / Rinsate / Other. Were field blanks identified in this SDG? METHOD: GC/MS BNA (EPA SW 846 Method 8270C) FB-04072016- RZD Blank ID y Y 批批 Compound Y N N/A VN N/A SDG#:

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

pulsamo	Blank ID		Sam	Sample Identification	uo		
a moduo							
CROL							

5x Phthalates 2x All others

FBLKASC2tronox.wpd

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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): 280-2836-4

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	VALIDATION COMPLET
SDG #:_	280-2836-4	Stage
Laborato	ry: Test America	

Date:_	6/14/11
Page:_	<u>l</u> of_/_
Reviewer:_	TV4
2nd Reviewer:	4

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

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

	Validation Area		Comments
I.	Technical holding times		Sampling dates: 4 /23/10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	20 RSD NY Ca/14 = 25 8
IV.	Continuing calibration/ICV	A	ca/14 = x3
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	ics '
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-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:

Call

	>01				
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. Hexachlorobutadiene**	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-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	חחח
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 Blanks

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Page:	Reviewer	2nd Reviewer:

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

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

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

Was the blank contaminated? If yes, please see qualification below. In date: 4/24/10 Blank analysis date: 4/24/10 Y/N N/A

Blank extraction date: 4/24/10 Blank analysis date: 4

(19) Sample Identification X Associated Samples: MB 280-12911 62.7 Blank ID FEE Conc. units:\_\_

date
alysis
Blank ar
date:
extraction
Blank

Associated Samples: Conc. units:

	Blenk ID	Sample Identification
Compound		
	**	
-		

<sup>5</sup>x Phthalates 2x all others

LDC#: \$3308 E 29

SDG #: La Corry

# VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of Reviewer: \_\_\_\_\_

> METHOD: GC/MS BNA (EPA SW 846 Method 8270C) Y N N/A

Were target compounds detected in the field blanks?

Slank units: 10 / L Associated sample units: 10 / L Were field blanks identified in this SDG?

Sampling date: 4 / 2 / 10 ... Sampling date: 4 / 2 / 10 ... Single hank type: (circle one) Field Blank) Rinsate / Other: 07/20/ 4

lank th	Sampling date: 4 /27 /10 Field blank type: (circle one) Field Blank) Rinsate / Other: Associated Samples: 4 //	Compound Blank ID Sample Identification	FB-04072010- RZD	PEE 2.2 (7 \$× FB)						
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Associated sample units:\_ Blank units:

Sampling date:

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

Associated Samples:

Compound	Blank ID	Sample identification
CROL		

5x Phthalates 2x All others

### 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 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 280-2836-6

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)	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 280-2836-6

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

### **Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

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Date: 6/14 /ho
Page: <u>1</u> of <u>)</u>
Reviewer: WG
2nd Reviewer:

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

LDC #: 23308F2a SDG #: 280-2836-6 Laboratory: Test America

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	<b>A</b>	Sampling dates: 4 /2 > /10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	20 RSD r7 COV/100 £ 25 }
IV.	Continuing calibration/ICV	A	CON /101 & 25 }
V.	Blanks	Α	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	<u> </u>	
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	WZ	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:

coil

	2011			7
1	SSAI3-06-3BPC	11	21	31
2	SSAI3-06-4BPC	12	22	32
2 3 4	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

# VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC, Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	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-octylphthalate**	חחח
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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3,28	
ر # 50 10 # 50	

## VALIDATION FINDINGS WORKSHEET Field Blanks

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

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

YN N/A Were target compounds detected in the field blanks?

Blank units: Work Associated sample units: Work Kasampling date: 4 / 7 / 10

Field blank type: (circle one) Field Blank) Rinsate / Other.

Associated Samples:

> \*

Sample Identification T.B K RZD FB-04673610-9. 4 Blank 1D EFE Compound CROL

Associated sample units:\_ Blank units:

Sampling date:\_

Field blank type: (circle one) Field Blank / Rinsate / Other.

Associated Samples:

Compound	Blank ID	Sample identification	
######################################			
CROL			

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

**LDC Report Date:** 

June 16, 2010

Matrix:

Soil

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 #:_	280-2836-8	
Laborato	rv Test America	

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 /23 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	20 KSD 17 Car/a 425 2
IV.	Continuing calibration/ICV	<u> </u>	car/10 = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	<u>N</u>	Client spec
VIII.	Laboratory control samples	A	2.0
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	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ZM)	+B = FB-04072010- RZD (280-2216-2)

Note:

LDC #:

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

	201				-
1	SSAI3-05-8BPC	11	21	31	
2	SSAI3-05-10BPC	12	22	32	
3	MB 280- 13949 /21-A	13	23	33	
4	12/11/	14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

# VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene⊶
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol™	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene™	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F, 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthaiate	AAA. Butyibenzyiphthalate	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-Thehlorophenol	00. 4-Nitroanlline	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**	กกก
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.

# VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: Reviewer: 2nd Reviewer:	10-1	3	8
	Fage:	Reviewer:	2nd Reviewer:

of clame?	9
Associated Samples:	Field blank type: (circle one) Rield Blank / Rinsate / Other:
•	Sampling date: 4 1/2
	Blank units: 49 / Associated sample units: 49 / C
	Y/N N/A Were target compounds detected in the field blanks?
	YNN Were field blanks identified in this SDG?
	AMETHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Associated Samples: A1/	Sample Identification		V 5x FB)				
ر د		0. RZD	ND ON				
Field Blank /	Blank ID	FB-04672610- RZD	EFF 22				
ampling date: 4 / 7 / 10   10   10   10   10   10   10   10	Compound		EEE			- Co	ראטר

Associated sample units:

Blank units: Sampling date:

Associated Samples.	Sample Identification					
/ Kinsale / Otnei.						
) Field blank	Blank ID					
Field blank type: (circle one) Field Blank / Killsate / Ottlei	Tui Came	ninodiiioo				Oac

5x Phthalates 2x All others

## 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

### 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
			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)	Р

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)	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 280-2879-6

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)	Р	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)	А	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

Stage 2B

Date:	6/14/10
Page:_	<u>l</u> of <u></u> /
Reviewer:	JYL
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
l.	Technical holding times	A	Sampling dates: 4/26 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	Α	2 RSD IV
IV.	Continuing calibration/ICV	4	Ca /w = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS ,
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SIX	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	F\$ = FB-04072010- RZD (280-2216-2)

Note:

LDC #: 2330812a

SDG #: 280-2879-6 Laboratory: Test America

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:

CALL

	>01	'			
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. Pentachlorophenol™	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
G. 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-Nitrophenoi*	XX. Di-n-butylphthalate	MMM. Bis(2-Chioroisopropyl)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. Pyrana	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachiorocyclopentadiene*	MM. 4-Chiorophenyl-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™	ກກກ
N. 2-Nitrophenol™	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VW.
O. 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.

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2330	4
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₩ DC	# 50C

10t	3/2	D
Page:	Reviewer:	2nd Reviewer:

LDC #: 25308 + 29	VALIDATION FINDINGS WORKSHEET
SDG #: La Cary	Field Blanks
WETHOD: COMS DNA (EDA SW) 948 Mathad 97000	
Y IN N/A Were field blanks identified in this SDG?	
Y/N N/A Were target compounds detected in the field blanks?	Janks?
ts:	
Sampling date: 4 /67//0	
Field blank type: (circle one) (Field Blank) Rinsate / Other:	Associated Samples: 41

( QN )						:	
<i>A</i> 1/	ıtion						
Associated Samples: #1/	Sample Identification						
Associated S	S						
)ther:							
)/ Rinsate / C		FB-04072010. RZD					
(Field Blank	Blank ID	FB-0407	2.7				
e: (circle one	pund		EFE				
Field blank type: (circle one) Kield Blank Rinsate / Other	Compound						CRQL

units:_	
sample	
Associated	
units:	
lank	

Sampling date: Field Blank / Rinsate / Other.

Associated Samples:

Compound	Blank ID		S	Sample Identification	ion		
CRQL							

5x Phthalates 2x All others

LDC#: 23708 TM SDG#: Ca Com

# VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLS

Page: 1 of 1 Reviewer: 016 2nd Reviewer: 0

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/N/A

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

Qualifications	J/M5/P (4)	2									
Associated Samples											
Finding	666, HHH unresolved										
Sample ID											
Date											
#											

Comments: See sample calculation verification worksheet for recalculations

## 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

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 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 280-2960-3

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)	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 280-2960-3

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2960-3	SSAR7-02-1BPC	All compounds reported below the PQL.	J (all detects)	А	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 2B

LDC #:	23308L2a	VALIDATION COMPLET	ΓΕ
SDG #:	280-2960-3	Stage	Э
Laborator	y: Test America		

Date: <u>4</u>	14 /ro
Page: 1	of
Reviewer:	NY
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	
1.	Technical holding times	A	Sampling dates: 4/27 /to	
II.	GC/MS Instrument performance check	A	,	
111.	Initial calibration	A	2 KSD Y	
IV.	Continuing calibration/ICV	A	ca/w = 25 b	
V.	Blanks	A		
VI.	Surrogate spikes	A		
VII.	Matrix spike/Matrix spike duplicates	N	Client spec	
VIII.	Laboratory control samples	Α	client spec	
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 64 06 2010 - RZB (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:

Con'l

	3011				
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. Phenol™	P. Bis(2-chloroethoxy)methane	EE, 2,6-Dinitrotoluene	TT. Pentachiorophenol™	III. Benzo(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-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-Chloroanlline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Ghloroisopropyl)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. Benzolc Acid
i, 4-Methyiphenoi	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	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate™	ົດດກ
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.
iltrophenol** -Dimethylphenol	CC. Dimethylphthalate DD. Acenaphthylene		1 11	GGG. Benzo(b)fluoranthene HHH. Benzo(k)fluoranthene

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

LDC#: 23308 L2A La Cores SDG #:

# VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: 4 Nb Page: 1 of

2nd Reviewer:\_

Were field blanks identified in this SDG? METHOD: GC/MS BNA (EPA SW 846 Method 8270C) Y N N/A

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

Sample Identification Associated Samples: VSX FB FB D4062010. RZB Blank ID 2,7 出出 Compound CROL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other

Associated Samples:

/			,	issociated campics.	H			
Compound	Blank ID			Sample	Sample Identification	c		
CRQL								
						*************	***************************************	

5x Phthalates 2x All others

.

# 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

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:

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 280-2960-5

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)	А	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 COMPLETENESS WORKSHEET

LDC #: 23308M2a	VALIDATION COMPLETEN
SDG #: 280-2960-5	Stage 2B
Laboratory: Test America	

Date: 6/4/lo
Page: 1 of 1
Reviewer: 3/4
2nd Reviewer: 4

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/to
II.	GC/MS Instrument performance check	Α	
111.	Initial calibration	A	2 RED IT
IV.	Continuing calibration/ICV	A	2 RSD 17 COV/101 £25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Α)	Client grec
VIII.	Laboratory control samples	A	Client spec
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:

Soil

	5011			
1	SSAK8-05-1BPC	11	21	31
2	MB 280 - 13949 /21-4	: 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-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-Chlorophenoi	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. Banzo(g,h,i)perylana
E. 1,4-Dichlorobenzene⊷	T. 4-Chloroanlline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY, Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. 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	111.
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	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.

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LDC #: "	SDG #:

# **VALIDATION FINDINGS WORKSHEET** Field Blanks

1 of 1	Me	<u>)</u>
Page:	Reviewer:_	2nd Reviewer:

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

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

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

Blank units: \( \frac{1}{2} \) Associated sample units: \( \frac{1}{2} \)

,	Field blank tyne: (circle one) Field Blank / Rinsate / Other:
67/10	one's Field Black
	k type: (circle)
Sampling date:	Field blan

	)						
Ċ	(QN)	/					
**	/ <sub>#</sub> /	ion					
	amples:	Sample Identification					
	Associated Samples:	S					
٥	ther:						
•	/ Rinsate / C		10- RZD				
(F)	() Field Blank	Blank ID	FB-04672010- RZD	<b>~</b> ′で			
129/62:	e: (circle one	pun		3.33			
Sampling date: 9 /67 /19	Field blank type: (circle one) Field Blank / Rinsate / Other	Compound					CROL

Blank units: Associated sample units: Sampling date: Field blank / Rinsate / Other:

Associated Samples:

	Blank IU		Sa	Sample Identification	tion		
CROL							

5x Phthalates 2x All others

# 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

<sup>\*\*</sup>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.
- Pata 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	4/07/10	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)	А

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** KSHEET

_DC #:	23308N2a	VALIDATION COMPLETENESS WOR
SDG #:_	280-2960-6	VALIDATION COMPLETENESS WOR Stage 2B/
_aborato	ry: <u>Test America</u>	

Page: 1 of 1 Reviewer: N 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
l.	Technical holding times	A	Sampling dates: 4 /27/16
11.	GC/MS Instrument performance check	A	
111.	Initial calibration		2 RSD 1~
IV.	Continuing calibration/ICV	A	CON/W = 25 }
V.	Blanks	<u> </u>	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
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	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	ZM	F\$ = FB-04672010- RZD (280-2216-2)

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

R = Rinsate

D = Duplicate TB = Trip blank

FB = Field blank

ND = No compounds detected

EB = Equipment blank

Validated Samples: 1:02

* .	279ge 4 3011				
+ 1	SSAK8-04-4BPC	11	MB 280- 13949 DI-A	- 21	31
2	SSAK8-04-5BPC ** D	12	/	22	32
3	SSAK8-04-5BPC_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

LDC #: 77.368 N2a SDG #: See Cover

# **VALIDATION FINDINGS CHECKLIST**

Page: \\_\ of \\_2 Reviewer: \_\_\_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_\_

Method: Semivolatiles (EPA SW 846 Method 8270C)

Metrica: Commodation (El 71 et 7 e 10 metrica e 27 e e)	7		T	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
III Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?		,		
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?		-		
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 0.05?				
IV Continuing calibration				And the second s
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥				
0.05? V. Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?	_		<u> </u>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/	<u> </u>	
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	/			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				The state of the s
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?	<u> </u>	/		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			_	
VIII, Laboratory control samples			•	Agricultus prosteriores de la companya de la compan
Was an LCS analyzed for this SDG?	/	<u>[</u>		

LDC #: 73368 N 29 SDG #: See Cover

# **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: 4
2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
iX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			D 3 28 2 3 7 82	
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?		N. 600'' (Table)	(*************************************	
XI. Target compound identification				The second secon
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	_			
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				A CONTRACTOR OF THE STATE OF TH
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).	Private			Andrews of the Superior Constitution of
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)?		/		
XIV. System performance	- 1- 10 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1			distribution of the second of
System performance was found to be acceptable.				
XV. Overall assessment of data				ng akaran digiri sa dalah dala
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates				A STATE OF THE PARTY OF THE PAR
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.		/		
XVII. Field blanks	,			
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.		1.		

# 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-Dichlorophenot**	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-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene™	JJ, Dibenzofuran	YY. Fluoranthene	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butyibenzyiphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyl-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-Trichiorophenol	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	חחח
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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LDC #:	SDG #:

# VALIDATION FINDINGS WORKSHEET Field Blanks

of	36	4
Page:	Reviewer:_	2nd Reviewer:_

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

Y N N/A Were field blanks identified in this SUG!

Were target compounds detected in the field blanks?

Slank units: 19 / L Associated sample units: 19 / S

Sampling date: 4 67 10 Field blank Rinsate / Other: 67

Associated Samples: 41/ (ND)	Sample Identification					
Slapk Rinsate / Other	<u>a</u>	FB-64072010- RZD	4			
Sampling date: 4 /0 / 10   Sampling date: 4 /0 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10 / 10 / 10 / 10   Sampling date: 4 /0 / 10 / 10 / 10 / 10 / 10 / 10 / 10	Compound Blank ID	13-04	7.2 3.3			CROL

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

Associated Samples:

ion					
Sample Identification					
Se					
			-		
Blank ID					
puni					
Compound					CRQL.

5x Phthalates 2x All others

LDC#: 23308 Nra SDG#: No Car

# Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

\_\_ of \_\_ Page:

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:

 $RRF = (A_x)(C_{is})/(A_{is})(C_x)$ 

 $C_x = Concentration of compound,$  $A_x = Area of Compound$ 

A<sub>is</sub> = Area of associated internal standard C<sub>is</sub> = Concentration of internal standard

> average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

S= Standard deviation of the RRFs,

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	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	40/20	40/20	40/20	40/20	40/20	40/20

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
160.00	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 # 22368 N 24 SDG # See Cover

# VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page of Page Subject of Page S

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:

ave. RRF = initial calibration average RRF

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

RRF = continuing calibration RRF

KKT = continuing calibration KKT

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)	%D	Q%
4	Y2041	05/05/10	1,4-Dioxane (IS1)	0.6718	0.6326	0.6326	5.8	5.8
			Naphthalene (IS2)	0.9990	0.9901	0.9901	6.0	6.0
			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	8.0	0.8
			Benzo(a)pyrene (IS6)	1.1042	1.1500	1.1500	4.1	4.1

Compound (Reference IS)	IS)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	529970	418891
Naphthalene	(182)	40/80	3249540	1640967
Fluorene	(183)	40/80	2525517	986110
Hexachlorobenzene	(184)	40/80	667483	1672491
Chrysene	(185)	40/80	3658447	1754242
Benzo(a)pyrene	(186)	40/80	3746932	1629142

# LDC #: 73 308 N 29 VALIDATION FINDINGS WORKSHEET SDG #: Sre Cover Surrogate Results Verification

Page:	<u>lof 1</u>
Reviewer:	W
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

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:

# 7

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	75.7	76	76	6
2-Fluorobiphenyl		77. 3	77	77	
Terphenyl-d14		88.8	89	89	
Phenol-d5	150	120.970	8)	8//	
2-Fluorophenol		117.6	78	78	
2,4,6-Tribromophenol		118.5	79	79	<b>X</b>
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

LDC #: 2330 & N 29 SDG #: See Corer

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

Page: lof 1 2nd Reviewer: O Reviewer:\_

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

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample duplicate were recalculated for the

compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

LCS 280-13949

	ias	9	as	a a	I CS	S	1 CSD	ds.	I CS/I CSD	csp
Compound	Add (	Added (NO /Ec)	Concer ( ZZ	Concentration ( MS / R)	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	Q
	l CS	) I GSD	l CS	O LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	25%	Ā	1770	KA.	22	20				\
Pentachlorophenol										
Pyrene	2530	<b>→</b>	1870		pz	1/2				
							\			

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	NZq
SDG #:	re Cover	

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u>l</u> of <u>1</u>
Reviewer:	W
2nd reviewer:_	A.

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

Υ	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?

•									
Concer	ntration	$= \frac{(A_{b})(I_{b})(V_{b})(DF)(2.0)}{(A_{b})(RRF)(V_{b})(V_{b})(\%S)}$	Example:						
$A_{x}$	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D	r		<b>D</b>			
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard							
l,	=	Amount of internal standard added in nanograms (ng)	Conc. = ((	)(	)(	)(	)(	_)(	<del></del>
$V_o$	=	Volume or weight of sample extract in milliliters (ml) or grams (g).							
V,	=	Volume of extract injected in microliters (ul)	=						
$V_{t}$	=	Volume of the concentrated extract in microliters (ui)							
Df	=	Dilution Factor.							
%S	=	Percent solids, applicable to soil and solid matrices only.							

2.0	= Factor of 2 to accoun	t for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
-					
_					
			100		
					·

# 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 29, 2010

Matrix:

Soil

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

<sup>\*\*</sup>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	Nitrobenzene-d5 Terphenyl-d14	40 (50-120) 44 (55-120)	All TCL compounds	J- (all detects) UJ (all non-detects)	Р

<sup>\*</sup>Removed Phenol-d5 and 2-Fluorophenol information since no reported compounds are associated to these surrogate.

# 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)	Р

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)	А

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)	Р	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)	Р	Project Quantitation Limit (q)
280-2995-1	RSAQ3-1BPC RSAQ3-2BPC SA169-1BPC SA169-2BPC SA110-1BPC SA110-2BPC SSAO6-04-3BPC** SSAO6-04-1BPC	All compounds reported below the PQL.	J (all detects)	А	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**

LDC#:	23308P2a	<b>VALIDATION COMPLETENESS WORKSHEET</b>
SDG#:_	280-2995-1	Stage 2B /4
Laborato	ry: Test America	7

Date: 6/15	10
Page:l_of_	$\perp$
Reviewer:	VL
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 /28 //o
11.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 RSD 17 COV/101 = 25 ]
IV.	Continuing calibration/ICV	A	ca/10 = 25 ]
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	κA	
XII.	Compound quantitation/CRQLs	214	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	MA	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB 04 06 2010 - KZB ( 280 - 2/31 - 2) \$\int = \times FB - 04 07 2010 - RZC ( 286 - 2280 - 2)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

R = Rinsate FB = Field blank

TB = Trip blank

EB = Equipment blank

Validated Samples:

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	

LDC #:	マッショ8	P>a
SDG #:	See Cover	

### **VALIDATION FINDINGS CHECKLIST**

Page: \\_\ of \\_2 Reviewer: \\_\(\sigma\)(. 2nd Reviewer: \\_\(\sigma\)

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Sernivolatiles (El A SVV 040 Method 02/00)				
Validation Area	Yes	No	NA	Findings/Comments
stechnical trading dimestary		-		2/16
All technical holding times were met.				
Cooler temperature criteria was met.			W. C. C. C.	
II/GCA STISIONEIRE AFOREIRE STEEL SEE				
Were the DFTPP performance results reviewed and found to be within the specified				
criteria?				
Were all samples analyzed within the 12 hour clock criteria?		North and S	N. 100 7 (2)	
III inital collection				200
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors	_			
(RRF) within method criteria for all CCCs and SPCCs?				,
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	_			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?				
<u>ទី</u> , ទទួកព្រឹក្សាទី (ខេត្ត ខេត្ត				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		sm.		
V Barge				
Was a method blank associated with every sample in this SDG?		<u> </u>		
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.		/		
Warrant and W. Durithia O. C. limita?	transitivi in			the country and the second of the country of the second
Were all surrogate %R within QC limits?	<del>                                     </del>	┝		·
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?		/	1	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
Management (AC) and making all a Unit (ACD) and and for	SS11, \$5.0	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 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?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences				
(RPD) within the QC limits?			carragizatio	
Enlysteise, at the facilities of the facilities				
Was an LCS analyzed for this SDG?		<u> </u>	<u> </u>	

LDC #: 23308 Prq SDG #: Sce Cover

### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: 102
2nd Reviewer: 1

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?				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?	ev 4 a 1944			
XSIMETRALSENGARIS				
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?		na marantanga it	\$190.19M	
Xe Cargel compound identification:		1		
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	4	<u> </u>	<u> </u>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	1			
Were chromatogram peaks verified and accounted for?				
gul Sangaszeghentlatenseker-			<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_		
XII) argaist cally a Granica Section 2 to 45 (474).				· ·
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?	1		_	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/	1	
AV 57 (C) 1997 (1992)		7		
System performance was found to be acceptable.			STATE OF THE	
Overall assessment of data was found to be acceptable.		1_		
Field dualizate pairs were identified in this STC		1	1	
Field duplicate pairs were identified in this SDG.	1	十	1	
Target compounds were detected in the field duplicates.		xyvenyen y		
VIL zelabenis				
Field blanks were identified in this SDG.	1	1/	-	
Target compounds were detected in the field blanks.		1_		

### VALIDATION FINDINGS WORKSHEET

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

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	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)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II, 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methyiphenol**	KK, 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	L.L. Diethyiphthalate	AAA. Butylbenzylphthalate	PPP, Benzolc Acid
1. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC, Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD, Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)⁴⁴	FFF. Di-n-octylphthalate**	ກດດ
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#: 23308 P29 SDG #: 52 Cm2

### VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of 1 Reviewer.\_\_ 2nd Reviewer.\_

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

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

Were target compounds detected in the field blanks?

Blank units: W / Associated sample units: W / Sampling date: 4 66 / 10

er: Associated Samples: 6	Sample Identification		( either ND or > 5x Fb/EB)					
/ Rinsate / Oth	(87/8)	EB	2.2					
Field Blank	Blank 16	F3	2.7			110- RZB	AZB	
Sampling date: 1/06 (10) Field blank/ Rinsate / Oth	Compound		CEE			FR = FB 04062010- RZB	EB = EBOJIN 2011 RZB	lOB3

sample units:
Associated
Blank units:

Field blank type: (circle one) Field Blank / Rinsate / Other. Sampling date:

Sample Identification Associated Samples: Blank ID Compound

5x Phthalates 2x All others

24 See Cons 20525 "DC#

SDG#:

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

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Page: Reviewer: 2nd Reviewer:

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

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

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? Were percent recoveries (%R) for surrogates within QC limits?

				<del></del>			<del></del> 7	<del></del>		<u>r</u>	<del></del>		-			—		<del></del>	7		<del></del> T		- 1	—	
Qualifications	5-/45/P (All Ta) (5)			<b>,</b>																					QC Limits (Water) 21-100 10-123 33-110*
lts)	( 27/ -25)	(23-(20)	( ez/-05)	( 22/-55)	( )	( )	(	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	(	( )	( )	( )	( )	( )	( )	QC Limits (Soil) 25-121 19-122 20-130*
%R (Limits)	*	37	40	44																					S5 (2FP)= 2-Fluorophenol S6 (TBP) = 2.4,6-Tribramophenol S7 (2CP) = 2-Chlorophenol-44 S8 (DCB) = 1,2-Dichlorobenzene-44
Surrogate	PHL	2FP	NBZ	HALL																					
QI e	( )																								OC Limits (Water) 35-114 43-116 33-141 10-94
Sample ID	8 (5x	/																							OC Limits (Soil) 45 23-120 N/ 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
#																									* QC lin \$1 (NBZ \$2 (FBP \$3 (TPH \$4 (PHL

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**5** 

SDG #: C. Cor

# VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CROLS

Page: of L 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 Associated Samples en resolved ### Finding 666 Sample ID Date

Comments: See sample calculation verification worksheet for recalculations

LDC#: ~73.0 & P24. SDG#: \_ Cs. [22~]

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Reviewer:

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

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

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

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

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

			A CONTRACTOR OF THE PROPERTY O	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	1,4-Dioxane (IS1)	0.6731	0.6731	0.6818	0.6818	5.4	5.44
	MSSD		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 (1S4)	0.2590	0.2590	0.2705	0.2705	14.0	13.97
			Chrysene (1S5)	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

_								
	Area IS	262046	997667	671030	1219394	1513952	1309806	
	Area cpd	220464	1381644	1155733	394826	2008107	1958223	
	nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20	

-				1		
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
160.00	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)	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 prq SDG # See Cover

### Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page 1 of 1 Reviewer:\_ 2nd Reviewer:

1 5 4 5 10 6 20 7 5 4 2 2 2 5 2 5 1 5 1 5 1 5 1 5 1 5 1 7 7 7 7 7 7 2

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

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated

for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

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		Averade RRF	Reported	Recalculated	Reported	Recalculated
	Standard ID	. 0	Compound (Reference 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
				1.1204	1.1479	1.1479	2.5	2.5
				1.3629	1.4115	1.4115	3.6	3.6
			robenzene	0.2705	0.2804	0.2804	3.7	3.7
				1.0324	1.0668	1.0668	3.3	3.3
			yrene	1.1835	1.2509	1.2509	5.7	5.7
-								

Compound (Reference IS)	13)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	384024	312973
Naphthalene	(182)	40/80	2646759	1152826
Fluorene	(183)	40/80	2305108	816564
Hexachlorobenzene	(IS4)	40/80	803868	1444254
Chrysene	(185)	40/80	3940883	1847115
Benzo(a)pyrene	(186)	40/80	3862774	1543947

30 cm

LDC#:_	ン?	308	Pza
SDG #:			

### **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:	_lof_1
Reviewer:	W.
2nd reviewer:	

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

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

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample	ID:	#	7_	(5×)

ample iD. π / (	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10	&o	80	80	٥
2-Fluorobiphenyl		80,5	81	81	
Terphenyl-d14		89.5	90	90	
Phenol-d5	120	119	79	79	
2-Fluorophenol		107.5	72	7~	
2,4,6-Tribromophenol		137	88	88	*
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4				<u></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					

Sample ID:

sample ib.	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-Chiorophenol-d4					
1,2-Dichlorobenzene-d4					

SDG #: Sre Care

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

Page: lof L Reviewer: 4

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:

SC = Sample concentation

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

SSC = Spiked sample concentration SA = Spike added

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples:

										Melalen	C
	ű	<u> </u>	Sample	Spiked	Sample	Matrix Spike	Spike	Matrix Spike Diplicate	Duplicara		
•	Add	Added	Concentration	Concentration	tration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
Compound		/KC.1	12/2/		S S					7 7 2	Docalminatod
	2	MSD	3	MS	MSD	Reported	Recalc	Reported	Recalc	Керопаа	Nei Sur Manuel
Phenol											
N-Nitroso-di-n-propyiamine											
4-Chloro-3-methylphenol										,	14
	26.20	272	Ø	1780	2050	د%	68	7	77	4	<del>d</del>
Acenaphurene											
Pentachlorophenol									1	-	1
Pyrene	2630	2000	29	2100	2480	77	77	36	2.		/

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 23308 pra SDG #: See Corer

## <u>Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification</u> VALIDATION FINDINGS WORKSHEET

Page: lof 1

2nd Reviewer: Reviewer:\_

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

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

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration SA = Spike added

RPD = 1 LCSC - LCSDC 1 \* 2/(LCSC + LCSDC)

Ş LCS/LCSD samples:

13357

		,								
	ű	iko	S	ike	<b>31</b>	CS	ä	csp	SD	I CS/I CSD
Compound		Added (No. No. )	Conce	Concentration ( 45 / E.)	Percent Recovery	ecovery	Percent Recovery	lecovery	R	RPD
-	85	/ 1 csn	SOI	1080	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										7
Acereshitene	2560	MA	2140	KA	84	#3				
one de chapter de la constant de la						-				
Pyrene	2560		25%		86	99				
		2		•						
				- Landon Maria						

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 #:	フォ	308	P29
SDG #:			

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	_lof_1_
Reviewer:_	pv
2nd reviewer:	W.

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

Υ	N	N/A
Y	N	N/A/
		abla

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?

•		·	
Concen	tration	$A = \frac{(A_{b})(1_{b})(V_{b})(DF)(2_{b})}{(A_{b})(RRF)(V_{b})(V_{b})(S)}$	Example:
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D,
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard	
i,	=	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)	=
$V_{\iota}$	=	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 accoun	t for GPC cleanup			
			Reported Concentration	Calculated Concentration	Qualification
#	Sample ID	Compound		<u> </u>	
-					
<b> </b>					
<b> </b>					
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-					
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					<u> </u>
			l		

### 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.
- 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	А	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

LDC #:	23308Q2a	VALIDATION COMPLETEN
SDG #:_	280-2995-2	Stage 2B
Laborato	ry: Test America	<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
I.	Technical holding times	A	Sampling dates: 4 /28 /10
II.	GC/MS Instrument performance check	A	/
111.	Initial calibration	A	2 RSD VY
IV.	Continuing calibration/ICV	A	ca/10 = 25 3
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	client spec
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	ZM,	EB = 1

Note: A

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water

	****				
1	EB0428 <b>/</b> 010-RZB	11	21	=	31
<b>†</b> 2	EB04287010-RZB  MB 280- 13927 /- 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-Chloroanlline	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene™	JJ. Dibenzofuran	YY, Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
i. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohoi
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. Nitrobenzene	AA. 2-Chioronaphthalene	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™	ກກກ
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.

K	
Q'	ž
23308	S
33	ز
4	
#	#
LDC	SDG

### **VALIDATION FINDINGS WORKSHEET**

101	3%	д
Page:	Reviewer:_	2nd Reviewer:

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

Was a method blank analyzed for each concentration preparation level? Was a method blank analyzed for each matrix? A Z Z Z

Y/N N/A

V N N/A Was the blank contaminated? If yes, please see qualification below. Blank analysis date: 5 1/10 Was a method blank associated with every sample?

Associated Samples:

=

Sample Identification MB 280-12927 Blank ID 1.88 443 Compound Conc. units:

date:_	
alysis	
Blank analysis date:	
₩ 	
date:	
<b>Blank extraction</b>	
nk ext	
Blai	

Associated Samples:	Sa				
	Sample Identification				

5x Phthalates 2x all others

73306 Q 29 q Cacor SDG #: LDC#:

### VALIDATION FINDINGS WORKSHEET

Field Blanks

Were target compounds detected in the field blanks?

Blank units: 49 /L Associated sample units: NA 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 fi

EB Sampling date: 4 / 2 8 / 62 Field blank type: (círcle one) Field Blank / Rinsate / Other

None

Sample Identification Associated Samples: Blank ID λ N EFE Compound CROL

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Associated Samples:

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	Cl Just	Sample Identification
Compound		
Sange		
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5x Phthalates 2x All others

### 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:

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

<sup>\*\*</sup>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 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	
MB280-14738/9-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)	А

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** ET

LDC #: 2	23308R2a	_VALIDATION COMPLETENESS WORKSHEE
SDG #:2	280-2995-5	_ Stage 2B /4
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Date:	15/10
Page:_	of
Reviewer:	OVE!
2nd Reviewer:	4

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	Α	
IV.	Continuing calibration/ICV	A	COV/101 = 25 }
V.	Blanks	SW	
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	
Χ.	Internal standards	A	
XI.	Target compound identification	w A	·
XII.	Compound quantitation/CRQLs	WA	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	×A	
XV.	Overall assessment of data	Á	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FB = FB-04072010-RZC (280_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	SSAN6-07-1BPC * Y	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

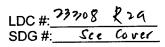
### LDC #: 33718 R>C SDG #: See Cover

### **VALIDATION FINDINGS CHECKLIST**

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Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)		-		
Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times 15 15 15 15 15 15 15 15 15 15 15 15 15				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?		(		
Were all samples analyzed within the 12 hour clock criteria?				
III. Initial calibration				The state of the s
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?				
IV Continuing salibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?				
V. Blanks				A CONTROL OF THE STATE OF THE S
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		•		
VI. Surrogate spikes				A STATE OF THE STA
Were all surrogate %R within QC limits?	-			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		-		
Was a MS/MSD analyzed every 20 samples of each matrix?	¢ .			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples				AND SECTION OF THE SE
Was an LCS analyzed for this SDG?				



### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: W/ 2nd Reviewer: 9

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	4			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control		7		1 2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			•	
X. Internal Standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	4			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs			T T	Berging and Artist Control of the Co
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 (TKCs)	an an		- 67	Alland Skill by Andrews and Angres (Skill by Angres (Skil
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)?				
XIV. System performance				unger der gerändige Karte der der der der der der der der der de
System performance was found to be acceptable.		-		
XV. Overall assessment of data to a bit of the state of t	See a see			Comparation of the state of the
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		7		
Target compounds were detected in the field duplicates.		<del>                                     </del>		
				CAT THE SECOND S
XVII. Field blanks	7	1		
Field blanks were identified in this SDG.	<del>Ľ</del>	+-	+	
Target compounds were detected in the field blanks.	<u>L</u>	/		

# VALIDATION FINDINGS WORKSHEET

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

A. Phenol⁴	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachloropheno!**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene™	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X, Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	711.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກກກ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VW.
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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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".

Was a method blank analyzed for each matrix? 

Was a method blank analyzed for each concentration preparation level? Was a method blank associated with every sample?

Associated Samples: V N/A Was the blank contaminated? If yes, please see qualification below. Blank analysis date: 5/10/10 Blank analysis date: 5/10/10

Sample Identification 2 ر م 4-4 MB 260-14738 Biank ID 72,7 アセセ 2 Compound Conc. units:

Blank extraction date:B	Blank analysis date:
Conc. units:	Associated Samples:

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

5x Phthalates 2x all others

LDC #: 23308 R24 SDG #: 54 Cm

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of
Reviewer: 1 of
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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:

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

 $A_x = \mbox{Area of Compound} \\ C_x = \mbox{Concentration of compound},$ 

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

S= Standard deviation of the RRFs, %RSD = 100 \* (S/X)

			Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
	Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
Standard ID		Compound (Internal Standard)	( 50 std)	( 50 std)	(Initial)	(Initial)		
ISAI	11	5/8/2010 11 4-Dioxane (IS1)	0.5851	0.5851	0.5791	0.5791	6.8	6.82
MSCD	2		1.0818	1.0818	1.0917	1.0917	2.8	2.83
NSS D			1.3573	1.3573	1.3205	1.3205	6.7	99.9
		ahanzaha	0.2608	0.2608	0.2633	0.2633	9.5	9.48
		2	1.0472	1.0472	1.0309	1.0309	3.1	3.14
		vrene	1.0983	1.0983	1.0834	1.0834	13.3	13.28

Area IS	305776	1135207	755377	1381076	1678262	1546473
Area cpd /	223629	1535127	1281626	450249	2196814	2123114
onc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20

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		1.0477	1.2120	0.2263	1.0128	0.9476
20.00		1.0478	1.2639	0.2397	1.0223	1.0101
50.00		1.0818	1.3573	0.2608	1.0472	1.0983
80.00	0.5842	1.0953	1.3253	0.2600	1.0539	1.1259
120.00	0.5666	1.1092	1.3832	0.2754	1.0748	1.1887
160.00	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
×	0.5791	1.0917	1.3205	0.2633	1.0309	1.0834
S		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 # 73306 R 24 SDG # See Cover

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

Page 1 of 1 2nd Reviewer: Reviewer:

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

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

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

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

Where:

RRF = (Ax)(Cis)/(Ais)(Cx)

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

Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	(	(Initial RRF)	(CC RRF)	(CC RRF)	%D	Q%
	14891	05/12/10	1.4-Dioxane	(IS1)	0.5791	0.5249	0.5249	9.4	9.4
-			Nanhthalene	(182)	1.0917	1.0945	1.0945	0.3	0.3
			Fluorene	(183)	1.3205	1.3456	1.3456	1.9	1.9
			Hexachlorobenzene	(184)	0.2633	0.2713	0.2713	3.0	3.1
			Chrysene	(185)	1.0309	1.0161	1.0161	1.4	1.4
			Benzo(a)byrene	(186)	1.0834	1.1127	1.1127	2.7	2.7

	(Kelelice 13)	Concentration	Area cpd	Area io
		(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
Chrysene	(185)	40/80	4037721	1986787
Benzo(a)pyrene	(981)	40/80	4197272	1886084

LDC#: 73708 \$ 2a SDG#: <u>Sre Cover</u>

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

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

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

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

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #

ample ib	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10	72.6	73	73	0
2-Fluorobiphenyl		77.3	ブフ	77	
Terphenyl-d14		99,7	99	99	
Phenol-d5	150	121.3	81'	81	
2-Fluorophenol		119.4	68	80	
2,4,6-Tribromophenol	Y	121.7	81	[3	V
2-Chlorophenol-d4		,			
1,2-Dichlorobenzene-d4					

Sample ID:

ample 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					

SDG #: See Care

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



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

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

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

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

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

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: \_\_

			0	Spiked	ame	Matrix Snike	Spike	Matrix Spike Duplicate	e Duplicate	MS/MSD	ds
	PpA	Spike Added	Concentration	Concentration (1/5)	tration	Percent Recovery	ecovery	Percent Recovery	Recovery	RPD	0
pupodupo	Q.	Men	<i>p</i>	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2860	0980	Þ	270	2222	98	80	78	28	W	m
Geographics				•							`
	2860	74.60	<b>+</b>	2490	2460	87	63	98	86		_
	r										-
											-

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

LDC#: 23308 R29 SDG #: See Cover

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

Reviewer.\_

Page: lof 1 2nd Reviewer.\_

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

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

% Recovery = 100 \* (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

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

250-147 38 16-A χŞ LCS/LCSD samples:

Concentration	
Reported   Recalc   Recalc   Recalc   Reported   Recalc   Recalc   Recalc   Recalc   Recalc   Recalc   Reported   Recalc   R	Added Concent
4 77 77 77 88	
88	CSD
\$	
\$8	
88	
2/ 88	
	1990
	2360

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#: 73308 R29 SDG #: Sre Cover

### VALIDATION FINDINGS WORKSHEET **Sample Calculation Verification**

Page:	_lof_1_
Reviewer:	1/2/
2nd reviewer:_	0

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

/	$\hat{Y}$	N	N/A
ľ	Y	N	N/A

%S

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?

Conc	entration	$ \begin{array}{ll} A = \frac{(A_{*})(I_{*})(V_{*})(DF)(2.0)}{(A_{*})(RRF)(V_{*})(V_{*})(%S)} \end{array} $
$A_{x}$	=	Area of the characteristic ion (EICP) for the compound to be measured
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard
l <sub>s</sub>	=	Amount of internal standard added in nanograms (ng)
V <sub>o</sub>	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
$V_i$	=	Volume of extract injected in microliters (ul)
V <sub>t</sub>	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.

Dilution Factor. Percent solids, applicable to soil and solid matrices only.

Example: Conc. = (192455)(40)(1.0m/)(1500)(1500)(1395254)(0.2633)(31.504)(0.92)7 720 ng lag

2.0	= Factor of 2 to account	t for GPC cleanup			
	0 1 10	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
#	Sample ID	Compound			
<u> </u>					
╟──					
<u> </u>					
<u> </u>					
-					
			<u> </u>		<u> </u>

### 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

Matrix:

Soil

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 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

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
SSAO5-05-2BPC	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)	P

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)	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 280-3059-3

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)	Р	Project Quantitation Limit (q)
280-3059-3	EB04282010-RZB	All compounds reported below the PQL.	J (all detects)	Α	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

23308T2a Stage 2B SDG #: 280-3059-3 Laboratory: Test America

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.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 /29 /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD 17 COV/101 6 25 2
IV.	Continuing calibration/ICV	_ A	carkaresz
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	K	Client grec
VIII.	Laboratory control samples	A	ics
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	Ą	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FB = FB - 04072010 - RZC (280 -2 280-7)

A = Acceptable Note:

N = Not provided/applicable

SW = See worksheet

R = Rinsate

ND = No compounds detected

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Cail

	70				
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. Phenoi**	P. Bis(2-chloroethoxy)methane	EE, 2,6-Dinitrotoluene	TT. Pentachlorophenol™	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	FF. 3-Ntroaniline	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-Chloroanlline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene**	JJ. Dibenzofuran	YY, Fluoranthene™	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol™	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethy(amine
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. 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	OO, 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA, 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	חחח
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.

LDC#: 23308 Tra SDG #: See

### Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

ot Reviewer: 2nd Reviewer:

Page:

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 M/A

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

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

	J/MJ/P (8)									
Associated Samples	ed									
Finding	G HHH UN resolved		-							
Sample ID	599									
# Date										

Comments: See sample calculation verification worksheet for recalculations

### 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

Matrix:

Soil

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
SSAQ4-04-1 BPC SSAO4-05-1 BPC SSAO4-05-1 BPC_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)	Р

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)	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

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:

	Concentra	ition (ug/Kg)	DDD	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)	<del>-</del>	-
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)	Р	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 #: 23308U2a VALIDATION COMPLETENE SDG #: 280-3059-4 Stage 2B Laboratory: Test America Page: 1 of / Reviewer: 1/2 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
l.	Technical holding times	A	Sampling dates: 4/29 /10
II.	GC/MS Instrument performance check	A	,
III.	Initial calibration	A	2 KSD r7 (a) /a = 252
IV.	Continuing calibration/ICV	Ā	(a) /a = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	<b>A</b>	us
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	SW)	$\mathcal{D} = 2,3$
XVII.	Field blanks	SW	FB = FB0406 2010 - RZB (380-2131->)

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:

Soil

	201			<del>, , , , , , , , , , , , , , , , , , , </del>
1	SSAQ4-04-1BPC	11	21	31
2	SSAQ4-05-1BPC <b>p</b>	12	22	32
3	SSA 24-05-1BPC_FD <b>b</b>	13	23	33
4	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)

A. Phenoi⁴	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
G. 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-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene	JJ. Dibenzofuran	YY, Fluoranthene	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol™	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z, 2,4,5-Trichlorophenol	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**	nnn
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.

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## VALIDATION FINDINGS WORKSHEET

Lof	3/(	
Page:	Reviewer:	2nd Reviewer:

	(an) (ND)
Field Blanks	Associated Samples
SDG #: Sc Com	Were field blanks identified in this SDG?  Y N N/A Were field blanks identified in this SDG?  Were target compounds detected in the field blanks?  Slank units: Were target compounds detected in the field blanks?  Sampling date: 4 66 / 10

77								
Compound	Blank 10			S	Sample Identification	tion		
	F\$ 0406,2010- RZB	1- RZB						
334	2.7							
	\							
ī cac								

Associated sample units:\_

		on				
	mples:	Sample Identification				
	Associated Samples:	Sal				
	A					
	ıer:					
e units:	Rinsate / Other:					
Associated sample units:_	Field Blank /	Blank ID				
Asso.	: (circle one)	pu				
Blank units:	Field blank type: (circle one) Field Blank / Rinsate /	Compound				CROL

5x Phthalates 2x All others

LDC# >3308 Und

### Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

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 MA

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

	J/M3/P (2)									
Associated Samples	red									
Finding	GGG HHH UNITSOMER									
Sample ID	123									
Date										
*										

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23308U2a SDG#:See cover

### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Reviewer: 2nd Reviewer:

METHOD: GC/MS PAH (EPA SW 846 Method 8270C)
Y/N\_NA Were field duplicate pairs identified in this SDG? Y NY NA

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

**LDC Report Date:** 

June 16, 2010

Matrix:

Soil

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

### 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)	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 280-3059-6

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

Stage 2B

	Date:	6/14/10
	Page:_	<u>l</u> of_/_
	Reviewer:	M
2nd	Reviewer:	

Laboratory: Test America

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

23308V2a

SDG #: 280-3059-6

LDC #:\_\_\_

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: 4/29 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	Α	2 KSD NY
IV.	Continuing calibration/ICV	A	CON /W = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Á	
VIII.	Laboratory control samples	A	ICS
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	ND	FB = FB-04 07 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:

	5011				
1	SSAO4-03-3BPC	11	21	31	
2	SSAO4-03-3BPCMS	12	22	32	
3	SSAO4-03-3BPCMSD	13	23	33	
4	MB 280 - 14797 1-A	14	24	34	
5	,	15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

**Collection Date:** 

April 29, 2010

**LDC Report Date:** 

June 16, 2010

Matrix:

Soil

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)	P

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)	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 280-3059-8

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)	Р	Project Quantitation Limit (q)
280-3059-8	SSAQ3-01-6BPC	All compounds reported below the PQL.	J (all detects)	Α	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 WORKSHEET

LDC #: 23308W2a Stage 2B SDG #: 280-3059-8 Laboratory: Test America

Date: 6/14 //o 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
1.	Technical holding times	A	Sampling dates: 4/24 /ro
H.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 KSD ~ CW/W ≤ 25 D
IV.	Continuing calibration/ICV	A	ca/a = 25 D
V	Blanks	Α	
VI.	Surrogate spikes	<u> </u>	
VII.	Matrix spike/Matrix spike duplicates	<del></del>	
VIII.	Laboratory control samples	A	W.S.
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	<u> </u>	
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	Ŋ	
XVII.	Field blanks	SN	FB = FB04662010- RZB (280-2131-7)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

#### Validated Samples:

				<del></del>	
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

# 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-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)peryiene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene	JJ. Dibenzofuran	YY, Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK, 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc 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	GGC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenoi	OO. 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**	· nnn
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.

LDC#: 23368 W29 3 3 SDG#:

## VALIDATION FINDINGS WORKSHEET Field Blanks

101	3	}
Page:	Reviewer:	2nd Reviewer:

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

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

Were target compounds detected in the field blanks?

Blank units: 16 / Associated sample units: 15 / ES

Sampling date: 4 / 66 / 10

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

₹ 2

Sample Identification Associated Samples: A 1/ PB 04662010-KZB Blank ID 7 此 Compound CROL

Associated sample units:\_ Blank units:

Associated Samples:

lold blank type:	,	
	CI America	Sample Identification
Compound	DIANK ID	
CROL		

5x Phthalates 2x All others

LDC # 2 2308 N 24 SDG #: 02~

# Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

Reviewer: 2nd Reviewer: Page:

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

N >

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

	口	T	T	T	7		T	T		Ī			
Qualifications	J/M3/p (c)												
Associated Samples	L												
Finding	GGG, HHH unradited												
Sample ID													
Date						-							
#										<u> </u>	<u> </u>		

Comments: See sample calculation verification worksheet for recalculations

### 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)	P

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)	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

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

	Concentra	ation (ug/Kg)	555	P. //		
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)	-	

#### 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)	Р	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

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

\_ Stage 2B

Date: 6	14/10
Page: 1	of /
Reviewer:	W
2nd Reviewer: (	7

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 /30/10
IÌ.	GC/MS Instrument performance check	À	,
III.	Initial calibration	A	2 KSD rx
IV.	Continuing calibration/ICV	A	2 KSD 17 COV /101 E 25 }
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	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	b = 5,6
XVII.	Field blanks	SW)	FB = F304062010- RZB (280-2131-2)

Note: A = Acceptable

LDC #: 23308X2a

SDG #: 280-3100-1 Laboratory: Test America

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:

Soi)

	301				 	
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 Phonosite	o of the Continue of the Chair	EE 2 6.Dinieratulone	TT Dentacklorophenoi**	III Benzo(a)ovrene**
A. Friendi		1. 1. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.		
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)perylene
E. 1,4-Dichlorobenzene™	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chiorolsopropyi)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene	JJ. Dibenzofuran	YY, Fluoranthene™	NNN. Aniline
G. 2-Methylphenol	V. 4-Chioro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	AAA. Butyibenzyiphthalate	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-Trichlorophenoi	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenoi	EEE. Bis(2-ethylhexyl)phthalate	TTT,
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate™	. חחח
N. 2-Nitrophenol**	CC. Dimethyiphthalate	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.

	_
X 2	3
23308	j
DC #: 3	# 50C

## VALIDATION FINDINGS WORKSHEET Field Blanks

Page:of	Reviewer: NG	2nd Reviewer: (/

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Y N N/A Were field blanks identified in this SDG?

N/A Were target compounds detected in the field blanks? Blank units: 4/6 / Associated sample units: 4/6 / Associated sample

Field blank type: (circle one) Field Blank Rinsate / Other. 90/ Sampling date:\_\_

Sample Identification Associated Samples: FB0406 2010 - RZB Blank ID 4 出出 Compound CROL

Associated sample units:\_ Blank units:

Sampling date:

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

Associated Samples:

Compound	Blank ID		Sa	Sample Identification	ion		
CRaL							

5x Phthalates 2x All others

LDC# 27308 X24 SDG #: Co

# Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

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 M/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?

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	a	0											
ifications	J/45/P	<u>.</u>											
Qual	1/4												
npies													
Associated Samples	ed												
Ass	444 peaks unresolved				-								
	N												
	peak	•											
Finding	###				:								
	666.	,											
Sample ID	,												
	72												
6													
Date													
#													

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23308X2a SDG#:See cover

#### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:	
Reviewer:	W
2nd Reviewer:	
_	

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

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

	Conc	( ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	5	6	(≤50%)	Dili		(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	≤360	
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

**LDC Report Date:** 

June 16, 2010

Matrix:

Soil

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)	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

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)	-	<b>-</b>

#### 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)	А	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	А	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

LDC #:	23308Y2a	VALIDATION COMPLETEN
SDG #:	280-3100-4	Stage 2B
Laborator	ry: Test America	

Date:	6/	14	<u>/r</u>
Page:_	10	of	1
Reviewer:		V	7
2nd Reviewer:		1	_

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: + /20 /10	
II.	GC/MS Instrument performance check	A	,	
HI.	Initial calibration	A	7 RSD rr	
IV.	Continuing calibration/ICV	A	CCU/100 = 250	
V.	Blanks	SW		,
VI.	Surrogate spikes	Α		
VII.	Matrix spike/Matrix spike duplicates	N	Client snec	
VIII.	Laboratory control samples	A	Client spec	
IX.	Regional Quality Assurance and Quality Control	N .		
X.	Internal standards	A		
XI.	Target compound identification	N		44.4
XII.	Compound quantitation/CRQLs	N		
XIII.	Tentatively identified compounds (TICs)	N		
XIV.	System performance	N		
XV.	Overall assessment of data	Ā		
XVI.	Field duplicates	SW	D = 1,7	
XVII.	Field blanks	<u>S</u> W	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:

Call

	5011		10.4900		
1	SSAK7-05-1BPC	11	21	3	31
2	SSAK7-05-1BPC_FD D	12	22	3	32
3	MB 280-14276/1-A	13	23	3	33
4	/	14	24	3	34
5		15	25	3	35
6		16	26	3	36
7		17	27	3	37
8		18	28	3	8
9		19	29	3	99
10		20	30	4	10

# **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-butyiphthalate	MMM. Bis(2-Chloroisopropyi)ether
F, 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol™	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB, 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroanlline	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-Ntroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	חחח
N. 2-Nitrophenol™	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
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.

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# VALIDATION FINDINGS WORKSHEET

10-1	N6	2
rage.	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?

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

Y N N/A Was the blank contaminated? If yes, please, see qualification below.

Blank extraction date: 5/66/P

(62)

Sample Identification Associated Samples: 86 4 MB 280-1427C/-A Blank ID 60.1 EE Ш Compound Conc. units:

Blank analysis date:	units:
ction date	
Blank extraction date:	Conc. units:

Associated Samples:

tion				
Sample Identification				
S				
Blank ID				
Compound				

5x Phthalates 2x all others

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# VALIDATION FINDINGS WORKSHEET

Field Blanks

MEIHOD: GC/MS BNA (EPA SW 846 Method 82/0C)	
YN N/A Were field blanks identified in this SDG?	
V/N N/A Were target compounds detected in the field planks?	
Blank units: 149/4 Associated sample units: 149/kg	
Sampling date: 4/07/10	
Field blank type: (circle one) Reld Blank/ Rinsate / Other:	Associated Samples:_

Compound         Blank ID         Sample Identification           FB-64672d/n-R2D         —         —           EE         2.7         —         FB)         —           CRQL         —         —         —         —										
FB-046729/10-RZD  EEE 2.7 (75×	Compound	Blank ID				š	ımple Identifica	tion		
t E ε ε ε ε ε ε ε ε ε ε ε ε ε ε ε ε ε ε		FB-046720	116-RZD							
CRQL	FEE	2.7		5X	Fb)					
CRQL				ر	\					
CRQL										
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	CRaL.									

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

	ion				
ımples:	Sample Identification				
Associated Samples:	Sa				
1					
her:					
/ Rinsate / Ot					
Field Blank	Blank ID				
Field blank type: (circle one) Field Blank / Rinsate / Other	Compound				
Field t					CROL

5x Phthalates 2x All others

LDC#: 23308Y2a SDG#:See cover

#### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:	
Reviewer:	.W
nd Reviewer:	1

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

Y N NA Y N NA

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	(≤50%)	Dill		(Parent Only)
bis(2-ethylhexyl)phthalate	94	86		8	≤350	
Dimethyl phthalate	40	350U		310	≤350	

V:\FIELD DUPLICATES\23308Y2a.wpd

### 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): 280-3100-6

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.
- 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
MB280-14475/1-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)	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 280-3100-6

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

23308Z2a LDC #:\_\_\_ Stage 2B SDG #: 280-3100-6 Laboratory: Test America

Date:	6/14/1
Page:_	1 of )
Reviewer:	DV6
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
l.	Technical holding times	A	Sampling dates: 4 /30 /10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 KSD +7 Cay /1 ay = 25 &
IV.	Continuing calibration/ICV	A	Ca /10 = 25 }
V.	Blanks	SN	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Sp.C.
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	Sw)	FB = FB-64072010 - RZD (280-2216-7)

A = Acceptable 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:

(5)

	301				
1	SSAK6-03-3BPC	11	21	31	
4	SSAK6-03-3BPC  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	

# 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. Acenaphthenem	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-Dichiorobenzene™	T. 4-Chloroanlline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene**	JJ. Dibenzofuran	YY, Fluoranthene™	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butyibenzyiphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Banzyi 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	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate™	UUU .
N. 2-Nitrophenoi**	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.

23308 Z2q	Land of
LDC#:	SDG#:

# VALIDATION FINDINGS WORKSHEET

Page:	Reviewer: 06	2nd Reviewer:
		(4

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? 

Was a method blank associated with every sample?

N N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 5/07/10 Blank analysis date: 5/02/10

Sample Identification Associated Samples: Z 83 MB 180- 14475 Blank ID 62.7 かた下 Compound Conc. units:

	Assoc
sis date:	
Blank analysis date:	
Blank extraction date:	S:
Blank extr	Conc. units:

Conc. units:		Associated Samples:
Compound	Blank ID	

5x Phthalates 2x all others

LDC#: 23308 229 SDG#:

## VALIDATION FINDINGS WORKSHEET Field Blanks

- Jo_  -	3/6	
Page:	Reviewer:_	2nd Reviewer:

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

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

N N/A Were target compounds detected in the field blanks?

Blank units: 1/2 / Associated sample units: 1/2 / Espanyling date: 4 / 67 / 10

Other:
insate /
lank/ R
(Field B
1 /67/0
: e: (circ
g date
Sampling date: 4 /67 /0 Field Blank/ Rinsate / Other:

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A //	ıtion						
samples:	Sample Identification						
Associated Samples:							
			YSK FB)				
Other:			5 1	ر			
k)/ Rinsate / (		F8-04672010-RZD					
e)(Field Blan	Blank ID	FB-0407.	FEF 2.2				
Field blank type: (circle one) (Field Blank)/ Rinsate / Other:	Compound		1949 				CROL

Associated sample units:\_ Blank units:

Sampling date:

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

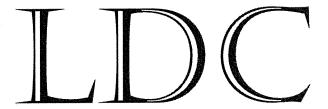
Associated Samples:

and completely and farming plant	(	
pairodado	Blank ID	Sample Identification
B1100		
CROI		

5x Phthalates 2x All others

### 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)	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 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)	Р	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 VALIDATION COMPLETENESS WORKSHEET**

Stage 2B

Date:	6/14 /
Page:_	1 <sub>of_</sub> )
Reviewer:	JV4
2nd Reviewer:	(l >

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
l.	Technical holding times	A	Sampling dates: 4/15/10
II.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	r ~
IV.	Continuing calibration/ICV	4	ca /10 = 20 2
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec LCS/D
VIII.	Laboratory control samples	SN)	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	Ñ	
XV.	Field blanks	M	FA = 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:

LDC #: 23308A3a SDG #: 280-2500-2

Laboratory: Test America

1010106

ν	)Ater			
1 EB-04152010-RIG2		21	31	
2 MB 280 - 11897	<b>1 /2-A</b> 12	22	32	
3	13	23	33	
4	14	24	34	
5	15	25	35	
6	16	26	36	
7	17	27	37	
8	18	28	38	
9	19	29	39	
10	20	30	40	

# VALIDATION FINDINGS WORKSHEET

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

A. alpha-BHC	I. Dieldrin	Q, Endrin ketone	Y. Aroclor-1242	<b>G</b> G.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Arocior-1248	нн.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA Arocior-1254	н.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	П
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	мм.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:\_

LDC# >3308 A 39 SDG #:

## VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: Of 2nd Reviewer:\_ 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?

YN N/A

Did all surrogate percent recoveries (%R) meet the QC limits?

Qualifications	5-/43/P (S)																			
%R (Limits)	(22/-89) 55	S7 ( \(\frac{1}{2}\)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	About 1
Surrogate Compound	B																			
Column	E.	42																		
Sample ID															- AMARIAN					
Date																				
#																				

Comments			
Recovery QC Limits (Water)			The second secon
Recovery QC Limits (Soil)			
Surrogate Compound	Totrochoromy	Decachlorohinhenvi	ᆀ
l etter Designation	<	τ α	Ω

LDC# 23308 A 34

SDG #:\_\_

VALIDATION FINDINGS WORKSHEET

**Laboratory Control Samples** 

Page: 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". A)NVA

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Y/V/V

C	Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
	a LCS
<u> </u>	Was
ver And Only	N(N/A/
<u>₹</u>	Z
>	

Qualifications	No gnal	( 10\$ D in )	/																							
Associated Samples	All																									
RPD (Limits)	( bx ) 56	( )		( )		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
LCSD %R (Limits)		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	(	( )
LCS %R (Limits)	33 (63-118	1	( )	( )	( )	( )	( )	( )	( )	( )		( )	( )	( )		( )	( )	( )	( )		( )	( )	( )	( )	( )	( )
Compound	11 4																									
) OSC PSO I	LCS 280- 1K97 / A																									
750	#																									

### 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)	Р

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)	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 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)	А	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

	Date:	15/10
	Page:_	<u>lof_l</u>
	Reviewer:_	NL
2nd	Reviewer:	0

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
1.	Technical holding times	SW	Sampling dates: 4/22/10
11.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	7. RSD 12
IV.	Continuing calibration/ICV	A	7. KSD 12 COV/101 = 20 B
V.	Blanks	A	
VI.	Surrogate spikes	SW)	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	ICS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB - 04 13 2010 - REG2 - RZE (280 - 240 -

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:

LDC #: 23308D3a SDG #: 280-2771-5

Laboratory: Test America

	[102				
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#	· ン	230 8	D	ろん
SDG #				

#### VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page:_	of
Reviewer:	JYC
2nd Reviewer:	9

All circled dates have exceeded the technical holding times.

Y N N/A Were all cooler temperatures within validation criteria?

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Quali
AII	S	N	4/22/10	5/11/10	5/13/10	19	J-/4
4.1.1				/ 11/19	/ · · · · · · · · · · · · · · · · · · ·		7
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#### **TECHNICAL HOLDING TIME CRITERIA**

Water:

Extracted within 7 days, analyzed within 40 days.

Soil:

Extracted within 14 days, analyzed within 40 days.

LDC# 23368 D29 SDG #:

## **VALIDATION FINDINGS WORKSHEET** Surrogate Spikes

Page: lof / Reviewer:\_ 2nd Reviewer:

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

Rease see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". AN Z V

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

Qualifications	No gual																				A STATE OF THE STA
%R (Limits)	1720 (51-115)	0 (63-124)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )		( )	
Surrogate Compound	¥	<b>~</b>																			
Column	24.																		SANAMA TITLE OF		
Sample ID	(x01) 1											Catalan Community of the Community of th									
Date																					
#																					

Comments

Recovery QC Limits (Water)

Recovery QC Limits (Soil)

Surrogate Compound

Letter Designation

മ

Tetrachoro-m-xylene Decachlorobiphenyl Page: Lof \_\_

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer: 376 2nd Reviewer: \_\_\_\_

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

LDC # 733 68 139 SDG # | Sc C-> Phease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SD Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction where the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the matrix or whenever a sample extraction whenever a sample extraction

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

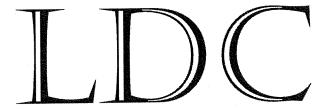
Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

																		<del></del>					<del></del>			<del></del> 1
Qualifications	No gual																									
Associated Samples																										
RPD (Limits)	( )	( )		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
MSD %R (LImits)	oplanlated)	ditution ()		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	· ·	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
MS %R (Limits)	1+5 me+	the to	)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	(. )
Compound	Resu	0																								
OI OSW/SW	2/2	( Xaal <sub>k</sub> )																								
) #																										

325

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

Metals



## 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)	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 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	А	bl
280-2500-2	EB-04152010-RIG2-RZE	Cobalt	1.0U ug/L	А	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** SS WORKSHEET

LDC #:	23308A4	_ VALIDATION COMPLETENES
SDG #:	280-2500-2	_ Stage 2B
Laborator	y: Test America	

Date:	<b>5/15/1</b> 0
Page:_ Reviewer:	
Reviewer _:2nd Reviewer	

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
II.	ICP/MS Tune	A	·
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	m5/D
VII.	Duplicate Sample Analysis	$\mathcal{N}$	·
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	B	
X.	Furnace Atomic Absorption QC	N	Notualized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	P	
XIV.	Field Duplicates	$\mathcal{N}$	
XV	Field Blanks	5W	EB=1,7 (no appoised Samples)

N.	$\sim$	ta.	
	О	ľ	

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

mer. Validated Samples:

,	WUTU					
1	EB-04152010-1RZD	11	8BW	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 #: 23308A4 SDG #: SECCOPOL

#### VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: of Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

<b></b>		
Sample ID	Matrix	Target Analyte List (TAL)
1,7		Al, Sb. As, Ba, Be, Cd, Ca, Cr, Co)Cu, Fe, Pla, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
QC-3.4		Al, Sb,(As) Ba, Be, Cd, Ca, Cr,(Ca), Cu, Fe, (Pb, Mg, Mp) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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,
		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, 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,
		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, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <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:	Mercury by CVAA if	f performed		

Page: of Of Reviewer: Q& (Reason: bl Sample Identification VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES 44 Associated Samples: Soil preparation factor applied: METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Sample Concentration units, unless otherwise noted:

H180262

LDC #: C/ CON SOOG #: Second

	A	SS	As	Ba	æ	3	Ca	ඊ	8	г	Đ.	Pb	Mg	Mn	ΡΉ	ż	ㅗ	ß	Ag	Na	F	۸	Σn	9	Mo	Sr ple results
																										S. CCB or PB concentration are listed above with the dentifications from the Validation Completeness Worksheet. These sample results
																										Worksheet.
																										npleteness
																										  idation Co
																										rom the Va
																										ntifications
																										with the de
																										sted above
																										ation are lis
																										B concentr
H									0.16/0																	COBOLE
														0.84/10	21											Cocieted IC:
Blank Action Limit																										se out som
Maximum ICB/CCB" (ug/L)			-										I													
Maximum Ma PB* IC (ug/L)									51100	<del> </del>	+			170 0	:											
Maximum May PB* I (mg/Kg) (u						<u> </u>				5			1		<u> </u>								<u> </u>			Sr S
				1	<u> </u>		<u> </u>		-	I			-		<u> </u>		I	1			1	<u> </u> 	<u> </u> 		<u> </u> 	
Analyte	Ā	र्ध	2 4	2 6		2 2	3 8	<u>ا</u> 8	<u> </u>	3   8	3 2	e   7	2 3	5 2	1	2) z	¥	2 0	1 5	2 2	F	:   >	, ,	jα	Ş	Š

LDC #: 23308A4

SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET** 

Page: Reviewer:\_ 2nd Reviewer:

Field Blanks

Field Blank: (be)

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

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

Sampling date: 4/16/10 Soil factor applied 100x Field blank 1/16/10 Field blank / Rinsate / Other: E N N/A

Associated Samples: Marabaciated Samples

				•			 	 	 =-	<del></del>	 	 	<del></del> 1
u													
Sample Identification				<b>2</b> 40									
Sample													
					-								
	Action Level												
Blank ID	-	0.84											
Analyte		Mn											

LDC #: 23308A4

SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET** 

Page: Reviewer: 2nd Reviewer:

Field Blanks

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

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

Were target analytes detected in the field blanks?

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/15/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other:

Field Blank: (be)

Associated Samples: No associated Samples

>			-												
	Sample Identification														
-	Sample														
													****		
		nc le													
		Action Level			9.4	90									
	Blank ID	2	0.18	0.16	9.4	20									
	Analyte		Pb	රි	Μ̈́	Mg									

## 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\*\*

<sup>\*\*</sup>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)	Α

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)	А	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 Henderson EET

		Tronox northgate richadioen
LDC #:	23308B4	VALIDATION COMPLETENESS WORKSH
SDG #:_	280-2500-8	_ Stage 2B <b>/</b> ↓
Laborato	rv: Test America	/ (

Date:	6-15-16
Page:_	1_of
Reviewer:	92
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	A	Sampling dates: 4/15/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	$\nearrow$	Client specified
VII.	Duplicate Sample Analysis	N	1
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	$\mathcal{N}$	Notuellized
XI.	ICP Serial Dilution	$\mathcal{N}$	Not preformed
XII.	Sample Result Verification	A	Notutilized Not preformed Not reviewed for ZB
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$\mathcal{N}$	
XV	Field Blanks	ND	EB=EB-04157010-RIGA-RZE, FB=FB-04137010-RIGA- (250-2500-2) (250-2460-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

C 280-2500-2) D = Duplicate

TB = Trip blank

EB = Equipment blank

\*\*(e) Validated Samples:

	50,1					
1	SA165-3BPC	11	୧୫୨	21	31	
2	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	

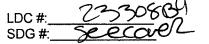
Notes:			
-			

#### **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 7
Reviewer: CR
2nd Reviewer: \_\_\_\_\_

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

Validation Area	Yes	No	NA	Findings/Comments
Vanidation Area  1. Fechinicalifieding upper State Control of the	163			1 inclings/comments
All technical holding times were met.		es superior		
Cooler temperature criteria was met.	/			
H. Gallistation:				
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?		Car by comband		
III. Bidoks . Faces			ı	
Was a method blank associated with every sample in this SDG?	V		<u> </u>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV-NGF Interiered Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV Matrixspike/Matrixspike/topilcates				
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?				
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

Page: Zof Z Reviewer: 2

Validation Area	Yes	No	NA	Findings/Comments
VA. Fullinates Acoust Absorbion of Co.			7	
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% OC limits?  VH-1GP: Separation in the second services of the s				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				~
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
Vijik linternaustaboands (EPKs)vii 846 viiethfod 6020vii ini 1				
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?				
IX: Regional Quality assurance and Quality control (###				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
Xc Sample Resultaventication:	T T		T T	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Xe overall as gessment of databases				
Overall assessment of data was found to be acceptable.				
Alis Field difficator	T	1		
Field duplicate pairs were identified in this SDG.			<u> </u>	
Target analytes were detected in the field duplicates.				
XIII-Fielderlanksen is an area and a second second				
Field blanks were identified in this SDG.			_	
Target analytes were detected in the field blanks.				

LDC #: 23201899 SDG #: 568001802

# Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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:

%R = Found × 100 True

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

Where,

					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)						
ICV	ICP/MS (inittal calibration)	As		0,0h	96	96	2-
CCN (OB 46)	ICP/MS (Continuing calibation)	<b>-</b>	48.8	50.05	94	26	<b>)</b> -
						)	

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.

100 # 28808/34 806 # 56 COLOR

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page:

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:

%R = Found × 100

Where, 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.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Where, S = Original sample concentration
D = Duplicate sample concentration

RPD = <u>IS-DL</u> x 100 (S+D)/2

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

%D = II-SDR x 100

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 18 /1 KS	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
3	O i	E	100 malc	100mg/L	001	IOO	)
53	Laboratory control sample	AS	18.5	072	63	25	<b>-</b> )
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	iCP serial dilution						

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

...

LDC #: 23704 (2) SDG #: <u>Secore</u>

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	L	of
Reviewer:	0	2
2nd reviewer:_		$\sim$

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

		(			
Please W N Y N Y N	see qua N/A N/A N/A	alifications below for all questions Have results been reported and Are results within the calibrated Are all detection limits below the	answered "N". Not applicated calculated correctly? range of the instruments are CRDL?	ble questions are identified as "N/A".	
Detect		/te results for	A5	were recalculated and verified using the	
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	8/1-/1000) (100mi)(5) = 6.6mg/	1
RD FV	=	Raw data concentration	(15,102	=6.6mg/	19
In. Vol.	=	Final volume (mi) Initial volume (mi) or weight (G)			U
Dil	=	Dilution factor	0 - 0	01/1/170)	
%S	=	Decimal percent solids	(0,8)	96) (1.178)	
			•		

Analyte	Reported Concentration (MK RG)	Calculated Concentration ( MX / KS )	Acceptable (Y/N)
A5	6.6	6,6	7
		· · · · · · · · · · · · · · · · · · ·	
	A5	A5 6.6	A3 6.6 6,6

## 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\*\*

<sup>\*\*</sup>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)	Α

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

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B // /

LDC #:	23308H4	_ VALIDATION COMPLETE
SDG #:_	280-2836-9	_ Stage 2
Laborator	y: Test America	

Date: 6-15-16

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: 4/23/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	`/\	Clientspecified
VII.	Duplicate Sample Analysis	$\mathcal{N}$	1
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	$\mathcal{N}$	Not utilized
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	MO	FB=FB-04072010 - RZO

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (280 - 2216 - Z) D = Duplicate

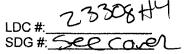
TB = Trip blank
EB = Equipment blank

\*\*Levery

Validated Samples:

	3/1				
1	SSAJ2-01-7BPC	11	21	31	
2	SSAJ2-01-9BPC	12	22	32	
3		13	23	33	
4		14	24	34	
5		15	25	35	
5 6 7 8		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:			

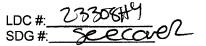


#### **VALIDATION FINDINGS CHECKLIST**

Page: of 7
Reviewer: 2nd Reviewer:

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

Welfdetien Area	Yes	No	NA	Findings/Comments
Validation Area	163	NO		Tittelings/00/illinene
All technical holding times were met.				
Cooler temperature criteria was met.		(		
II Calibration & Activities (Calibration Calibration C				
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?		50%5X5500055		
III. Bianta				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV ICP Injeries Check Sample 1935 a				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	ما			
IW:Matrix:spike/Matrix:spike/Giplicates	ı		I	
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 sampless				
Was an LCS anaylzed for this SDG?			ļ	
Was an LCS analyzed per extraction batch?			<b> </b>	
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**

Page: Zof Z Reviewer: CZ 2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
WilesmaceAusingsAbsorption (C.a.				
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?				
VILIGE Second libition of the state of the s				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?			<u> </u>	
Were all percent differences (%Ds) < 10%?			/	b
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
VIII blicaria saliterras (EPA SVA 645 juletji 6076020).				
Were all the percent recoveries (%R) within the 30-120% of the intensity o				
If the %Rs were outside the criteria, was a reanalysis performed?				
IX Regional on an incassinance and quality controlled a second second				
Were performance evaluation (PE) samples performed?			<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Sample Result Verification of the Section 1995				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI-Overall assessment of states as				
Overall assessment of data was found to be acceptable.				
XII sheja dupirches				
Field duplicate pairs were identified in this SDG.			<u> </u>	
Target analytes were detected in the field duplicates.				
XIIInerielden auf Sang au en Karan anne en Gast e				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.	<u> </u>			

LDC#\_2328H4 SDG#\_566046/

# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: cof / Reviewer: GZ 2nd Reviewer:

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

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

%R = Found × 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initfal callbration)						
	GFAA (Initial calibration)	-					
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
PA PA	ICP/MS (Initial calibration)	AS	41,0	40D	103	201	<i>)</i> ~
CV633	CU(63:3) ICP/MS (Continuing calibation)	$\rightarrow$	51.0	50.0	201	201	<i>)</i> ~

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.

SDG #: SE COLOR LDC# 23308H4

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

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

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:

Where, 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.

%R = Found × 100

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = <u>IS-DL</u> x 100 (S+D)/2

Where, S = Original sample concentration

D = Duplicate sample concentration

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

%D = II-SDR x 100

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

-							
					Receiculated	Reported	
Oi elumeS	Type of Analysis	Element	Found / S / I	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
1CSBR3	ICP interference check	3	9992	100 mg/r	$ \infty $	∞ <sub>I</sub>	>
152	Laboratory control sample		10,0 7	20.0 mg/k	95	S)	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Matrix spike		(SSR-SR)	l			
1	Duplicate						
/	ICP serial dilution						

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

700 CE X

LDC #: 23306H9 SDG #: <u>Secover</u>

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

Please W N I Y N I Y N I	see qua <u>N/A</u> N/A N/A	nave results been reported a	I range of the instruments and within the linear range of the ICP?	
Detecte followin	ed analyl g equati	te results for	were recalculated and verified using the	
Concentr	ation =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	
RD FV In. Vol. Dil	=	Raw data concentration Final volume (mi) Initial volume (ml) or weight (G) Dilution factor	(65.8 mg/L) (5) (100mL) = 32 mg/kg	5
%S	=	Decimal percent solids	)	

		Reported	Calculated	
Sample ID	Analyte	Reported Concentration (MS/KG)	Concentration	Acceptable (Y/N)
2	AS	32	32	I Y
				,
			**************************************	
			·	

# 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)	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

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)	А	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 SHEET

LDC #: 23308O4	_ VALIDATION COMPLETENESS WORKS
SDG #: 280-2960-7	Stage 2B
Laboratory: Test America	

Date: 6-15	K
Page: of	
Reviewer:	
2nd Reviewer: V	

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/27/10
II.	ICP/MS Tune	À	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	$\mathcal{N}$	Client specified
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LC5
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notukilized
XI.	ICP Serial Dilution	N	Not presorred
XII.	Sample Result Verification	N	3
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$\sim$	
XV	Field Blanks	ND	FB= FB-04072010- RZD

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (780-2216-7) D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

	<b>4</b> )(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:			
		-,-	

## 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

<sup>\*\*</sup>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	SA56-1BPC 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)	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

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	tion (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)	-	-	-

	Concentrat	tion (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	SSAN6-07-1BPC SSAN6-07-5BPC RSAQ3-1BPC RSAQ3-2BPC SA56-1BPC SA56-2BPC_FD SA48-1BPC** 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)	Α	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

### **Tronox Northgate Henderson** S WORKSHEET

LDC #:	23308P4	VALIDATION COMPLETENE	S
SDG #:	280-2995-1	Stage 2B	11
Laborator	v: Test America		/ `

Date: 6-15-16	
Page: <u></u> _of <u></u>	
Reviewer: C	
2nd Reviewer:	

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/2x/10
11.	ICP/MS Tune	A	
III.	Calibration	4	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	<i>N</i>	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notueilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	No+reviewed for 2B
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(6,7), (8,9)
ΧV	Field Blanks	NO	FB=FB-04072010-BZC, FB04062010-BZB
lote:	A - Accentable ND - N		(280-2280-2) (280-2131-1)

٨	In	ŧΔ	

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (280-2280-2) D = Duplicate

TB = Trip blank EB = Equipment blank EB = FB04281010 - RZB (280-2995-Z)

Validated Samples:

\*\* Level 4

	<u>~</u>						
1	SSAN6-07-1BPC	11	SA09-1BPC	21	PB5	31	
2	SSAN6-07-5BPC	12	SA09-2BPC	22		32	
3	RSAQ3-1BPC	13	SA188-1BPC	23		33	
4	RSAQ3-2BPC	14	SA188-2BPC	24		34	
5	SA56-1BPC	15	RSAN6-1BPC	25		35	
6	SA56-2BPC	16	RSAN6-2BPC	26		36	
7	SA56-2BPC_FD	17	SSAN6-07-1BPCMS	27		37	
8	SA48-1BPC **	18	SSAN6-07-1BPCMSD	28		38	
9	SA48-1BPC_FD	19	RSAQ3-2BPCMS	29		39	
10	SA48-2BPC	20	RSAQ3-2BPCMSD	30		40	

Notes:			
		,	

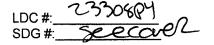
\_DC#: 2330889 SDG#: See Cover

### **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 7 Reviewer: CP 2nd Reviewer: \_\_\_\_\_

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

Method: Metals (EPA SW 846 Method 6010/7000/6020)		-		
Validation Area	Yes	No	NA	Findings/Comments
Frechical folding times 25 25 25 25 25 25 25 25 25 25 25 25 25				
All technical holding times were met.				
Cooler temperature criteria was met.				
ii Calibratens sees as a see a see			,	
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?				
III Blanks		<u> </u>		
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
IV-ICP Intercence/ChecksCample				20 10 10 10 10 10 10 10 10 10 10 10 10 10
Were ICP interference check samples performed daily?			ļ	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV: Matrix spike/Matrix spike dupilcales t				
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 Eaboratory control samples in 1995		1		
Was an LCS anaylzed for this SDG?	<u> </u>	<u> </u>		
Was an LCS analyzed per extraction batch?	_/	4_	_	
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**

Page: Zof Z Reviewer: CZ 2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
Westingeration proposition and the second of				
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% OC limits?  Vitaice Sega Dileton				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
Vill the maistennance (EDX Styl 846 MeHoa) (520) (C. A. L.				T.
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: Regionals many assumance and semanty dominous assumance of			1/2	
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?				
X SampleRestitaVerifications - 1997		1	Ī	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Overalla e el supplica del el e				
Overall assessment of data was found to be acceptable.	/	1		
XII-laalotuujig 1850				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	<b>/</b>			
XIIVE BODING AND CONTRACTOR OF THE STATE OF				
Field blanks were identified in this SDG.	/	1	_	
Target analytes were detected in the field blanks.	<u> </u>			

LDC #: 23306PY SDG #: 500007

### VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer: \_\_\_\_\_\_

All circled elements are applicable to each sample.

Sample ID Matri	x 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
CX: 17,18	Al, Sb(As)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
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,
	Al, Sb, As, 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, Tl, V, Zn, 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,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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,
	Al, Sb, As, 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, 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, Tl, V, Zn, Mo, B, Si, CN,
	Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Analysis Method
ICP	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
ICP Trace	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Π, V, Zn, Mo, B, Si, CN,
ICP-MS	Al, Sb(As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GFAA	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments:	Mercury by CVAA if performed	and the second s	

Soil preparation factor applied: #51 CDX
Associated Semi-LDC #: ( / / DK )
SDG #: (LAC) 19(K, )
METHOD: Trace Metals (EPA SW 846 Method 6010/7000)
Sample Concentration units, unless otherwise noted:

Associated Samples:

Page: of Reviewer: C.2

2nd Reviewer:

S ₹ Ş £ ₽ B 8 8 8 æ 된 \$ කී 8 Ö æ Z 8 ₽ F > ž ₹ × 0 (4017 MZ) 200 Blank Action Limit Maximum ICB/CCB\* (na/r) 6280 Maximum PB" (T/67) Maximum (mg/Kg) PB. Analyte . Z å 8 B ž 톼 Ag ž Zu ਨ ő ပိ 8 å Sb Ba 9 Ä Ö ¥

LDC#:_	23308P4
SDG#	See Cover

### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Page: <u>L</u>	_of_\
Reviewer:_	<u>c</u> -
2nd Reviewer:_	

METHOD: Metals (EPA Method 6020/7000)

YN NA YN NA

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

	Concentration	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

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	8	9	RPD	Difference	Limits	(Parent Only)
Arsenic	3.3	3.4	3			

SDG#: 23308P<sup>1</sup>/ SDG#: <u>Seecov</u>e/L

# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: cof Reviewer: GZ

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

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

%R = Found × 100 Where True

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

					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)						
ICV	ICP/MS (Initial calibration)	AS	784	Q'0h		8	7
Charas	ICP/MS (Continuing calibation)	<b>→</b>	8.64	900		(2)	٨

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.

SDG #: SER COLON 73328101 LDC #:

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

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:

%R = Found × 100 True

Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

Where,

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = <u>IS-DI</u> × 100 (S+D)/2

S = Original sample concentration D = Duplicate sample concentration Where,

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

%D = |-SDR| × 100

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 18/19/15	True / D / SDR (antes)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
1000	ICP interference check	R	718001	100 mg/r	100	100	<b>)</b> -
5	Laboratory control sample		7/61	20	96	96	
17	Matrix spike		(ssr-sr) (9,6	21.7	90	90	
21/18	Duplicate		h'£2	8'52	2	2	
	ICP serial dilution	$\rightarrow$	3.8	4.13	4.7	6'8	$\rightarrow$

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.

\$400 m

### **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

2nd reviewer:

METHO	D: Trace Meta	is (EPA SW 846 Method 6010/	7000)			
Please se N N N/ Y N N/ Y N N/	A Are re	ns below for all questions answ results been reported and calco sults within the calibrated rango detection limits below the CRI	ulated co e of the i	rrectiv?		
Detected following	analyte resul	ts for	A <	)	were recalculated and	verified using the
RD = FV = In. Vol. = Dil = 200	(In. Vol. Raw dat Final vol. Initial vo	.)(%S) la concentration lume (mi) lume (mi) or weight (G) factor	Recalcu	(0,947)	X100m4) =	3,3 mg/kg
%S =	mple ID	percent solids Analyte		Reported Concentration ( M2   CG )	Calculated Concentration ( Mg/Cg )	Acceptable (Y/N)
	\$	AS		3,3	3,3	7
			······································			
			~·········			
			····			
			<del></del>			

# 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 23, 2010

Matrix:

Water

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

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

\*Sample Identification

EB04282010-RZB EB04282010-RZBMS EB04282010-RZBMSD

<sup>\*</sup>Corrected all sample IDs from EB04281010 to EB04282010

### 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 EB04282010-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)	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 280-2995-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-2	EB04282010-RZB	All analytes reported below the PQL.	J (all detects)	Α	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 VALIDATION COMPLETENESS WORKSHEET**

LDC #:	23308Q4
SDG #:	280-2995-2
Laboratory	Test America

Stage 2B

Date: 6-15-16
Page: 1 of)
Reviewer: _ c
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	ms/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	` <i>N</i>	Norveilized
XI.	ICP Serial Dilution	4	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	7	
XIV.	Field Duplicates	$\mathcal{N}$	
χV	Field Blanks	DN	EB=1 (no appropriated 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:

1	EB0428 <b>7</b> 010-RZB	11	RBW	21	31	
2	EB04281010-RZBMS	12		22	32	
3	EB0428 010-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)	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

No field duplicates were identified in this SDG.

#### 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	VALIDATION COMPLE
SDG #:	280-2995-6	_ Stag
Laborator	v: Test America	

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
1.	Technical holding times	А	Sampling dates: 4/78/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	· N	Notukitzed
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	P	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-04072010-BZC

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (750-2750-2) D = Duplicate TB = Trip blank

TB = Trip blank EB = Equipment blank

Validated Samples:

	۱۰۱ه					
1	SSAN6-07-7BPC	11	805	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:

	Concentra						
Compound	SSAK7-05-1BPC	SSAK7-05-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	3.0	3.3	10 (≤50)	-	-	-	

	Concentra						
Compound	SSAQ5-01-1BPC	SSAQ5-01-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	14	24	53 (≤50)	•	J (all detects)	А	

#### 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)	А	Sample result verification (PQL) (sp)
280-3100-1	SSAQ5-01-1BPC SSAQ5-01-1BPC-FD	Arsenic	J (all detects)	А	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**

LDC #: 23308X4 Stage 2B SDG #: 280-3100-1 Laboratory: Test America

Page: L of | Reviewer: C/Z 2nd Reviewer:\_ L

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	A	Sampling dates: 4/30/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	mslD
VII.	Duplicate Sample Analysis	$\sim$	
VIII.	Laboratory Control Samples (LCS)	A	LCS
iX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	No+ utilized
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	PNO	FB=FB0406010-RZB, FB-04072010-RZD (280-2131-1) D=Duplicate (280-2216-2)
Note:	A = Acceptable ND = No	o compounds	( 280-2131-1 ) ( 280-2216-2 ) s detected D = Duplicate

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

**タ・**2(**3 1- )** 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#:	23308X4			
SDG#:	See	Cover		

#### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Page: of_
Reviewer: CCC
2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

XN NA YN NA

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

**Collection Date:** 

April 15, 2010

LDC Report Date:

June 23, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

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

#### \*Sample Identification

SA129-4BPC

SSAM4-02-2BPCMS

**SA129-6BPC** 

SSAM4-02-2BPCMSD

**SA129-8BPC** 

SSAM4-02-2BPCDUP

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

SSAN4-01-6BPC

SSAN4-01-8BPC

SSAN4-01-10BPC

<sup>\*\*</sup>Indicates sample underwent Stage 4 review

<sup>\*</sup>Corrected first SSAN4-01-8BPC ID to SSAN4-01-6BPC

#### 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)	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 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	concentration (mg/Kg)					
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 SSAM5-02-6BPC** SSAM5-02-6BPC** SSAM5-02-6BPC SSAM5-02-6BPC_FD SSAM5-02-6BPC_FD SSAM4-02-2BPC** SSAM4-02-6BPC SSAM4-02-6BPC SSAM4-01-4BPC SSAN4-01-4BPC SSAN4-01-4BPC SSAN4-01-6BPC SSAN4-01-6BPC SSAN4-01-6BPC 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

#### **Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Date: 6-15-10
Page:of
Reviewer: C2
2nd Reviewer:

LDC #: 23308A6	VALIDATION COMPLETENCES WORKSTILLT	Date. O 17 10
SDG #: 280-2500-2	Stage 2B	Page:of
Laboratory: Test America		Reviewer: CZ
		2nd Reviewer:
METHOD: (Analyte) Perchic	orate (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
1.	Technical holding times	A	Sampling dates: 4/15/10
lla.	Initial calibration	A	
IIb.	Calibration verification	P	
111.	Blanks	P	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	De .
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(7,10)
_X_	Field blanks	QN	FB=FB-64132010-RIGZ-RZE, FB-04072010-RZC (250-2-100-2) (250-2-250-2)
nte:	A = Accentable	ND = No compound	(250-2400-2) (250-2250-2)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

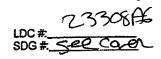
\*\* Level 4 FB = Field blank

(250-2-100-2)
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples

p							
1	SA129-4BPC	11	SSAM4-02-2BPC	21	SSAM4-02-2BPCMS	31	
2	SA129-6BPC	12	SSAM4-02-4BPC	22	SSAM4-02-2BPCMSD	32	
3	SA129-8BPC	13	SSAM4-02-6BPC	23	1 DUP	33	
4	SA129-9BPC **	14	SSAM4-02-8BPC	24		34	
5	SSAM5-02-2BPC	15	SSAM4-02-10BPC	25		35	
6	SSAM5-02-4BPC	16	SSAN4-01-2BPC	26	·	36	
7	SSAM5-02-6BPC	17	SSAN4-01-4BPC	27		37	
8	SSAM5-02-8BPC	18	SSAN4-01-8BPC	28		38	
9	SSAM5-02-108PC	19	SSAN4-01-8BPC	29		39	
10	SSAM5-02-6BPC_FD	20	SSAN4-01-10BPC	30		40	

Notes:			
	· · · · · · · · · · · · · · · · · · ·	 	 



#### **VALIDATION FINDINGS CHECKLIST**

Page: Of Z Reviewer: CS 2nd Reviewer:

Method:Inorganics (EPA Method Secroper)

Metriod:Inorganics (EPA Metriod )	T	T	ī	
Validation Area	Yes	No	NA	Findings/Comments
Commence and the commence of t				
All technical holding times were met.				
Cooler temperature criteria was met.	1			
Were all instruments calibrated daily, each set-up time?	/			· ·
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?		_		
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)			1	
		45.5		
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		
			Y.	
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.	1			·
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	1			
Was an LCS anayized for this SDG?	1			
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	1			
y seranga and assume marchine tages - a				
Were performance evaluation (PE) samples performed?		1		
Were the performance evaluation (PF) samples within the acceptance limits?			1	

LDC #: 23306 Pb SDG #: <u>See cover</u>

#### VALIDATION FINDINGS CHECKLIST

Page: 7 of 7
Reviewer: 2
2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
Sample Record Virticolici				
Were Fil.s adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were detection limits < RL?				
VIII ON A SESSION OF COME AND SESSION OF SES				Security of the second
Overall assessment of data was found to be acceptable.	/			
X PARCHICIDATES				
Field duplicate pairs were identified in this SDG.	1	<u>'</u>		
Target analytes were detected in the field duplicates.				
∑ Felt: Blacks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.	<u> </u>		<u> </u>	

LDC#:	23308A6
SDG#:	See Cover

#### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:_	of
Reviewer:	CC
2nd Reviewer:	<u>~</u>

Inorganics, Method: See Cover

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

TDC#: 723%

# Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

2nd Reviewer: 12

Method: Inorganics, Method \_\_

0.76

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula: was recalculated.Calibration date:  $\sqrt{|\mathcal{U}|}$ The correlation coefficient (r) for the calibration of COO

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

Type of analysis Analyte Standard Initial calibration s1  S2 S3 CVOY s4 S5 S6	andard     Conc. (ug/l)       s1     1       s2     2.5       s3     5       s4     10       s5     20	0.0025 0.00841 0.01661 0.03291	r orr²	r or r <sup>2</sup>	)-
5		0.0025 0.00841 0.01661 0.03291	0.998765	0.998771	)-
5		0.00841	0.998765	0.998771	)-
<u> </u>		0.01661			)-
7		0.03291			<b>Varia</b>
98	<del></del>	0.06345			
98					~
	s6 40	0.14097			
Calibration verification	22 13	18,8910 18,8910	hb		
Calibration verification	2 3	09292	hb		
Calibration verification	01 73	01-6:01	901	)	>

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.\_ \*

23308198 LDC #:

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer:

METHOD: Inorganics, Method Seccored

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

Where, %R = Found x 100

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result), concentration of each analyte in the source.

True ==

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = 1S-DL \times 100 \text{ Where,}$  (S+D)/2

Original sample concentration Duplicate sample concentration 11 II 00 Q

	•	٠		1	Recalculated	Reported	
Sample 1D	Type of Analysis	Element	Found / 8 (with year)	True / D  (worthe) y / K <	%R / RPD	SR/RPD	Acceptable (Y/N)
537	Laboratory control sample	(la <sub>1</sub>	24 6,107	0,099 8 107	107	67	)- ·
S	Matrix apike sample		(sen.en) QLO	789	b11 :	lld.	
52	Duplicate sample	$\rightarrow$	630	E13		2	<b>&gt;</b>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recelculated results.

TOTCLC.6

\$ 13 A A

	23306Pb
LDC #	:23306Ab

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	ر م
Reviewer:	de_
2nd reviewer:	

METHOD: Inorganics, Method Second	ns answered "N". Not applica	ble questions are identified as "N/A".
Y N N/A  Y N N/A  Y N N/A  Y N N/A  Are results within the calibrate  Y N N/A  Are all detection limits below  Compound (analyte) results for  recalculated and verified using the following of	ed range of the instruments? the CRQL?	reported with a positive detect were
Concentration =  Area-Offset Prepfactor (DF)  Slage  % Solid		+0.008)/1000)(1000)(10) = 230mg/kg

(0.896)

	Sample ID	Analyte	Reported Concentration (MS/K)	Calculated Concentration ( mg/(5)	Acceptable (Y/N)
#	14	CO.	230	730	4
	4	909		- 200	
					·
<b>-</b>					
-					
<b> </b>					
<u> </u>					
<u> </u>					
<u></u>					
					<u> </u>
	<u> </u>	·		1.	
<u></u>					

Note:	

# 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

#### 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)	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 280-2879-7

SDG	Sample	Analyte	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

# **Tronox Northgate Henderson**

LDC #: 23308J6	VALIDATION COMPLETENESS WORKSHEET	Date: <u>6-15-1</u> 0
SDG #: 280-2879-7	_ Stage 2B	Page: 1 of Reviewer: C
Laboratory: Test America	_	Reviewer: CC
•		2nd Reviewer:
METHOD: (Analyte) Perch	lorate (EPA Method 314.0)	<del> </del>

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: 4/26/10
lla.	Initial calibration	M ()	
llb.	Calibration verification	P	
111.	Blanks	6	
IV	Matrix Spike/Matrix Spike Duplicates	$\mathcal{N}$	Client specified
V	Duplicates	$\mathcal{N}$	, ,
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	$\wedge$	
L <sub>X</sub>	Field blanks	SW	FB = FB04 062010-RZB

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(280-2131-2) D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>				
1	SSAR6-04-7BPC	11	285	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:_			

233087 LDC#: 23204A6

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: Reviewer:\_ Page:

METHOD: Inorganics, EPA Method See Cover AN N/A Were field blanks identified in this SDG?

Were target analytes detected in the field blanks? Were field blanks identified in this SDG?

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

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

Sampling date: 4/6/10 Soil-factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Reason Code: bf

	tification					
ples: P\\	Sample Identification					
Associated Samples: A		Ox)				
Asi		sayals (70x)				
اد		Nogglo				
applied 10x Rinsate / Othe	Action Limit		9.2			
Soft factor (Field Blank / F	) PŁ	010-RZB 3-2131- <b>3</b> 3)	2			
/6/10 circle one)/F	Blank HD	FB04062010-RZB (SDG#: 280-2131-26)	92			
Sampling date: 4/6/10 Soit-factor applied 10x Field blank type: (circle one)/Field Blank / Rinsate / Other:	Analyte		CIO4			

# 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	ple Finding		A or P
All samples in SDG 280-2879-8	All analytes reported below the PQL.	J (all detects)	Α

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

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

	Date:	6-15-1
	Page:_	Lof
	Reviewer:	R
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
1.	Technical holding times	A	Sampling dates: 4/26/10
lla.	Initial calibration	Ŕ	
llb.	Calibration verification	B	
111.	Blanks	B	,
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	OP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	P	
IX.	Field duplicates	N,	
L <sub>X</sub>	Field blanks	SW	FB = FB04062010-RZB

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(280-2131-2) D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

<u> Soil</u>

	<u> </u>					
1	SSAR6-04-10BPC	11	PB5	21	31	
2	SSAR6-04-10BPCMS	12		22	32	
3	SSAR6-04-10BPCMSD	13		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	
10		20		30	40	

Notes:		

7.5.5.8. LDC #:-23204A6

SDG #: See Cover

# **VALIDATION FINDINGS WORKSHEET**

Page:\_\_

2nd Reviewer: Reviewer:

Field Blanks

METHOD: Inorganics, EPA Method See Cover Y N N/A Were field blanks identified in this SDG?

Were target analytes detected in the field blanks?

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

Y N N/A Were target analytes detected in the field bla

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

Sampling date: 4/6/10 Soil factor applied 10x

Field blank type: (circle one Field Blank / Rinsate / Other.

Reason Code: bf

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		ion					
		ntificat					
10	nples: [71]	Sample Identification					
	Associated Samples: [71]						
	Ass						
			lo quels				
(	Ú		Vo d				
×	ther:						
applied 10	Rinsate / C	Action Limit		9.2			
Sampling date: 4/6/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:	le one∫Field Blank≀	Blank ID	FB04062010-RZB (SDG#: 280-2131-29)	92			
date: 4/6/1	ık type: (circ	Analyte	)				
Sampling	Field blar	Ana	ğ	CIO4			

# 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)	Α

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

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

	Date: <u>G-15-b</u>
	Page: <u></u> of <u>\</u>
	Reviewer: _ CC
2nd	Reviewer:

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

LDC #: 23308P6

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
l.	Technical holding times	A	Sampling dates: 4/28/10
IIa.	Initial calibration	A	
llb.	Calibration verification	A	
HI.	Blanks	A	,
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCSD
VII.	Sample result verification	N	
´VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	NO	FB=FB-04072010-BZC

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(280-2280-2) D= Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

50:1

	<u> </u>				
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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

**Collection Date:** 

April 30, 2010

**LDC Report Date:** 

June 15, 2010

Matrix:

Soil

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

#### 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:

Sampling Field Blank ID 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)	Α	

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)		DDD	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

# Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

LDC #:_	23308X6	
SDG #:	280-3100-1	
Laborat	ory: Test America	

Date:	6-15-
Page:_	<u>l</u> of <u>l</u>
Reviewer:	9
2nd Reviewer:	1

VIETHOD: (	(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: 4/30/10
IIa.	Initial calibration	A	
Ilb.	Calibration verification	A	
Ш.	Blanks	A	,
IV	Matrix Spike/Matrix Spike Duplicates	N.	Client specified
V	Duplicates	N	4
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	IA	
IX.	Field duplicates	SW	(2,3)
Х	Field blanks	SW	1=B= FB04062010-RZB (280-2131-2)
	A - A ND -	Na samanawad	(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:

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 #: 23308X6

SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET** 

Field Blanks

Reviewer: CR 2nd Reviewer:

Were target analytes detected in the field blanks? Were field blanks identified in this SDG?

METHOD: Inorganics, EPA Method See Cover

Y N N/A

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/6/10 Soft Tastor applied 10x Field blank type: (circle one)(Field Blank / Rinsate / Other:

Reason Code: bf

-	r:					
ples: All						
sociated Sam						
As						
er:		No Qualifiers				
Rinsate / Othe	Action Limit		9.2			
ield blank type: (circle one)(Field Blank / Rinsate / Other:	Blank ID	FB04062010-RZB (SDG#: 280-2131-29)	92			
ield blank type: (c	Analyte		CIO4			

LDC#: <u>233</u> SDG#: <u>Se</u>		Page: Of	·	
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?			

	Concentration (mg/Kg)					
Analyte	2	3	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	210	190	10			

V:\FIELD DUPLICATES\FD\_inorganic\23308X6.wpd