

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 4, 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 May 5, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23162:

SDG#

Fraction

280-2352-5, 280-2400-1, 280-2400-4 280-2400-6, 280-2448-1, 280-2448-2 280-2448-4, 280-2448-6, 280-2448-7 280-2448-8, 280-2448-9, 280-2448-10 280-2500-1, 280-2500-4, 280-2500-5 280-2500-6, 280-2541-1, 280-2541-4 Semivolatiles, Chlorinated Pesticides, Metals. Perchlorate

280-2500-6, 280-2541-1, 280-2541-4 280-2541-6, 280-2541-8, 280-2699-1

280-2771-3, 280-2216-8

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

Attachment 1

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Reviewer: <u>JE</u> 2nd Reviewer: <u>BC</u>

LDC #: 23162

SDG #: <u>280-2352-5</u>, <u>280-2400-1</u>, <u>280-2400-4</u>, <u>280-2400-6</u>, <u>280-2448-1</u>

280-2448-2, 280-2448-4, 280-2448-6, 280-2448-7, 280-2448-8

280-2448-9, 280-2448-10, 280-2500-1, 280-2500-4, 280-2500-5

280-2500-6, 280-2541-1, 280-2541-4, 280-2541-6, 280-2541-8

280-2699-1, 280-2771-3, 280-2216-8

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness		Ī		
Is there an EDD for the associated Tronox validation report?	X		auto-th	
ILEDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X	minera . C. 42.4	c: avt.com	
III. EDD Lab Anomalies	411	1.1	lii .	
Were EDD anomalies identified?		X		
If yes, were they corrected or documented for the client?			Х	
IV. EDD Delivery				
Was the final EDD sent to the client?	Х			

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23162

Semivolatiles



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 12, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-5

Sample Identification

SSAN6-02-3BPC

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.

Sample EB-04122010-RIG2-RZC (from SDG 280-2352-2) was identified as an equipment blank. No semivolatile contaminants were found in this blank.

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 280-2352-5	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 280-2352-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2352-5	SSAN6-02-3BPC	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 280-2352-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2352-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2352-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23162A2a	VALIDATION COMPLETENESS WORKSHEET	
SDG #: 280-2352-5	Stage 2B	
Laboratory: Test America	-	Re

Page: | of | 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 /12 /16
Ш	GC/MS Instrument performance check	A	
<u> </u>	Initial calibration	A	2 RSP 12
IV.	Continuing calibration/ICV	A	2 RSP 12 ccv/1cv = 25 3
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Å	SSA I3-62-1BPC
VIII.	Laboratory control samples	A	1cs
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	7	
XVII.	Field blanks	DA	FB = FB-04072010-RZC (250-2250-2)

EB = EB-0412-2010- RIG2-RZC (380-2352-2)

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected D = Duplicate

R = Rinsate

TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

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	5011			
1	SSAN6-02-3BPC	11	21	31
2	MB 280-11289 /-A	12	22	32
3		13	23	33
4		14	24	34
5		15	25	35
6		16	26	36
7	10.1	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 13, 2010

LDC Report Date: May 20, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-4

Sample Identification

SSAK3-01-1BPC

SSAJ3-03-1BPC

SSAJ3-03-1BPC FD

SSAM3-01-2BPC

SSAI3-02-1BPC

SSAI3-03-1BPC

SSAI3-03-1BPC FD

SSAI2-01-1BPC

SSAI2-01-1BPC FD

SSAI3-02-1BPCMS

SSAI3-02-1BPCMSD

Introduction

This data review covers 11 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).

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- 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).
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- 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.
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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.

Samples EB-04132010-RIG3-RZD (from SDG 280-2400-2) was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04132010-RIG3-RZD	4/13/10	Di-n-octylphthalate	1.6 ug/L	SSAK3-01-1BPC SSAJ3-03-1BPC SSAJ3-03-1BPC_FD SSAI3-02-1BPC SSAI3-03-1BPC SSAI3-03-1BPC_FD SSAI2-01-1BPC SSAI2-01-1BPC_FD

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

Samples FB-04132010-RIG2-RZE (from SDG 280-2400-2) and FB-04072010-RZD (from SDG 280-2216-2) 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-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	SSAK3-01-1BPC SSAJ3-03-1BPC_FD SSAJ3-02-1BPC_FD SSAI3-02-1BPC SSAI3-03-1BPC SSAI3-03-1BPC_FD SSAI2-01-1BPC_FD
FB-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	SSAM3-01-2BPC

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.

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 280-2400-4	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 SSAJ3-03-1BPC and SSAJ3-03-1BPC_FD, samples SSAI3-03-1BPC and SSAI3-03-1BPC_FD, and samples SSAI2-01-1BPC and SSAI2-01-1BPC_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 280-2400-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2400-4	SSAK3-01-1 BPC SSAJ3-03-1 BPC FD SSAJ3-03-1 BPC FD SSAM3-01-2BPC SSAJ3-02-1 BPC SSAJ3-03-1 BPC SSAJ2-01-1 BPC FD SSAJ2-01-1 BPC 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 280-2400-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2400-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2400-4

No Sample Data Qualified in this SDG

Tronox Northqate Henderson

DC #: 23162C2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2400-4	Stage 2B
_aboratory: Test America	

	Date:	5	/20	10
	Page:_	1	of_	1
	Reviewer:			V6
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: 4/3/10
11.	GC/MS Instrument performance check	f)	
111.	Initial calibration	Α	7 RSD V
IV.	Continuing calibration/ICV	Α	ca /w = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	Ą	ucs .
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	$D_1 = 2, 3$ $D_2 = 6, 7$ $D_3 = 8, 9$
XVII.	Field blanks	SW	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

EB-= A = Acceptable ND = No compounds detected Note:

N = Not provided/applicable R = Rinsate SW = See worksheet

FB = Field blank

Validated Samples: Soil

1	SSAK3-01-1BPC		11	SSAI3-02-1BPCMSD	21	MB 280-11289/1-A	31	
2	SSAJ3-03-1BPC	10	12		22	,	32]
3	SSAJ3-03-1BPC_FD	Ь,	13		23		33	
	SSAM3-01-2BPC		14		24		34	
4 - 5	SSAI3-02-1BPC		15		25		35	
6	SSAI3-03-1BPC	Dr	16		26		36	
7	-SSAI3-03-1BPC_FD	b,	17		27		37	
8	SSAI2-01-1BPC	03	18		28		38	
9	SSAI2-01-1BPC_FD	<i>b</i> 3	19		29		39	
10	SSAI3-02-1BPCMS		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-Chioro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ດບບ
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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2316	3
DC #:`	SDG #

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: 1 of Reviewer: 2nd Reviewer:

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

	3
Were field blanks identified in this SDG?	11
ed in this	Late atal
identifie	4
d blanks	
ere field	4
Š	
ΑN	4/14

| V | N/A | Were field blanks identified in this SDG? | Were target compounds detected in the field blanks? | Blank units: | Were target compounds detected in the field blanks? | Blank units: | Were target compounds detected in the field blanks? | Blank units: | Were field blanks? | Associated sample units: | Were field blanks? | Sampling date: | Were field blanks? | Associated sample units: | Were field blanks? | Were field blanks in this SDG? | Were field blanks in this SDG? | Were field blanks? | Were field blanks. | Were field blanks? | Were field blanks. | Were fie

ert 4	(4A)							
	4/1	ıtion						
	amples:	Sample Identification						
	Associated Samples:_	1 1	BEB Chronin REGS. RZA					
		0413200-RIG3-RZD	Arcagank				ta	
2 20)ther:		EDEBLA	EZ .	1.6		Sphahale	•
ple units: 4	// Rinsate / C		FB-04673010- RZD				EBERT DIS (3-0 + HIJVHEXA) DEMAKALINE)
ociated sample 4	(Field Blank	Blank ID	FB-04673	2,2			bistare	
Stank units: 1/9 /L Associated sample units: 1/9	ield blank type: (circle one)(Field Blank/ Rinsate / Other	Compound		FEE	FEF		AEBEN	
Slank units:	einpling us	Con						CROI

Blank units: 49 /L Associated sample units: 49 /kg Sampling date: 4/19/10

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

Associated Samples:

Sample Identification - RZE FB-0413-2010-RIGZ Blank ID ب 年 FFE Compound

5x Phthalates 2x All others

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-6

Sample Identification

SA86-3BPC

SA86-4BPC

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.

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 (r²) were greater than or equal to 0.990.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

Date	Compound	%D	Associated Samples	Flag	A or P
4/28/10	Benzo(g,h,i)perylene	25.7	All samples in SDG 280-2400-6	J- (all detects) UJ (all non-detects)	A

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

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

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-12617/15-A	4/26/10	Bis(2-ethylhexyl)phthalate	119 ug/Kg	All samples in SDG 280-2400-6

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 TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA86-3BPC	Bis(2-ethylhexyl)phthalate	190 ug/Kg	190U ug/Kg
SA86-4BPC	Bis(2-ethylhexyl)phthalate	160 ug/Kg	160U ug/Kg

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	All samples in SDG 280-2400-6

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.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2400-6	All compounds reported below the PQL.	J (all detects)	Α

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

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 280-2400-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2400-6	SA86-3BPC SA86-4BPC	Benzo(g,h,i)perylene	J- (all detects) UJ (all non-detects)	Р	Continuing calibration (%D) (c)
280-2400-6	SA86-3BPC SA86-4BPC	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 280-2400-6

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2400-6	SA86-3BPC	Bis(2-ethylhexyl)phthalate	190U ug/Kg	А	bl
280-2400-6	SA86-4BPC	Bis(2-ethylhexyl)phthalate	160U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2400-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

_DC #:23162D2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:280-2400-6	Stage 2B 4
aboratory: Test America	

Reviewer: 376 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 1/3 /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	3 Kib in
IV.	Continuing calibration/ICV	ZW)	ca /a = 252
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	LCS .
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	MA	
XII.	Compound quantitation/CRQLs	N A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	MA	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SM	FB = FB-04132010-RIG2-RZE (280-2400-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Call

	SOI			-	
1	SA86-3BPC	11	21	21 31	
2	SA86-4BPC	12	22	22 32	
3	MB 280-12617/15-A	13	23	23 33	
4	/	14	24	24 34	
5		15	25	25 35	
6		16	26	26 36	
7		17	27	27 37	
8		18	28	28 38	
9		19	29	29 39	
10		20	30	30 40	

VALIDATION FINDINGS CHECKLIST

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
t. 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?				4.5 p
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		1		1
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	1 /			
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			I	
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?		ļ	/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				en e
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?		/		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			-	
VIII. Laboratory control samples		·		
Was an LCS analyzed for this SDG?		1		·

LDC#: Y3162 Dra SDG#: Sce Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: Jyl 2nd Reviewer: ____

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control	T			
Were performance evaluation (PE) samples performed?	 	/		
Were the performance evaluation (PE) samples within the acceptance limits?				III u
X. Internal standards		r		
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				5 (2) (2) (3) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	14			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	1/			
Were chromatogram peaks verified and accounted for?		1		
XII. Compound quantitation/CRQLs	т	T	T	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1 /	/		
XIII. Tentatively identified compounds (TiCs)	T	ī	-	
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?	Э			
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance				
System performance was found to be acceptable.	/	1		· · · · · · · · · · · · · · · · · · ·
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.		/		
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.			\mathbb{L}	
Target compounds were detected in the field duplicates.			-	
XVII. Field blanks				
Field blanks were identified in this SDG.			7	
Target compounds were detected in the field blanks.		Ţ	\Box	

VALIDATION FINDINGS WORKSHEET

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

A Phenol**	P. Bis(2-chloroethoxv)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. Hexachiorobutadiene**	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	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
l. 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	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກດກ
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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23/62	

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of

2nd Reviewer: Reviewer:_

to the LDC# SDG #:

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

A/N/A

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

Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?

		 	 	 	 	 		 	=	 	 	 		 	 	
	(2) \/ \langle \/ \langle \/ \langle \/ \															
Associated Samples	Ail															
Finding RRF (Limit: >0.05)																
Finding %D (Limit: <25.0%)	25.7															
Compound	(-) 177															
Standard ID	66698															
Date	4/18/10															
#													<u> </u>			

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VALIDATION FINDINGS WORKSHEET

Page: 1 of 1

Reviewer: 2nd Reviewer:

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Associated Samples:

Blanks

Blanks	
SDG #: See Control	METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

Was a method blank analyzed for each concentration preparation level?

N/A Y N N/A

Y/N N/A

Was a method blank analyzed for each matrix?

Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 4 / 26 / 10 Blank analysis date: 4 / 26 / 14 Was a method blank associated with every sample?

Conc. units:

tion							tion				
Sample Identification							Sample Identification				
S											
	~	h/ 09/				Associated Samples:					
	1	190 /4	,			Associa					
	617/5-A					/sis date:					
Blank ID	MB 180-12 \$17/5-A	611				Blank analysis date:	Blank ID				
Compound		77.1				Blank extraction date:Conc. units:	Compound				

5x Phthalates 2x all others

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VALIDATION FINDINGS WORKSHEET Field Blanks

) 	
Page: Reviewer:	

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

Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Sampling date: Y N N/A N N/A Blank units:

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

Sample Identification Associated Samples: RZE FB-04 1329 10- RIG2-Blank 1D - : EEE FFF Compound CROL

Associated sample units: Blank units:

Sampling date:

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

5x Phthalates 2x All others

LDC#: 73/62 brd SDG#: Ced [med

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

1 of 1 Page: 2nd Reviewer: Reviewer:

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

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

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

average RRF = sum of the RRFs/number of standards

 C_x = Concentration of compound, A_x = Area of Compound

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

%RSD = 100 * (S/X)

S= Standard deviation of the RRFs,

			Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
	Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
Standard ID	Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)		
ICAL	4/22/2010	4/22/2010 1,4-Dioxane (IS1)	0.6130	0.6130	0.6040	0.6040	2.1	2.14
MSS B		Naphthalene (IS2)	1.0911	1.0911	1.0540	1.0540	6.7	69.9
		Fluorene (IS3)	1.3019	1.3019	1.2492	1.2492	4.5	4.52
		Hexachlorobenzene (IS4)	0.2538	0.2538	0.2511	0.2511	3.6	3.61
		Chrysene (IS5)	1.1097	1.1097	1.0545	1.0545	8.2	8.19
		Benzo(a)pyrene (IS6)	1.0764	1.0764	286.0	0.9937	14.5	14.47

								_
***************************************	Area IS	307221	1221162	706188	1164007	1296367	1218617	
	Area cpd	235401	1665444	1149242	369322	1798192	1639645	
	nc IS/Cpd	40/50	40/20	40/20	40/20	40/50	40/20	

4.00 0.6245 10.00 0.5990 20.00 0.6128 50.00 0.6130 80.00 0.5845 120.00 0.5923	1.1466 1.1042 1.1120 1.0911	1.2580 1.3214 1.3019	0.2683 0.2534 0.2528 0.2538	1.1503	0.7055 0.8430 0.9921
	1.1042	1.2891	0.2534 0.2528 0.2538	1.1412	0.8430
	1.1120	1.3214	0.2528	1.1033	0.9921
	1.0911	1.3019	0.2538		70107
		1 2517		1.1097	1.0/64
	1.0366	1165.1	0.2500	1.0481	1.0885
	1.0166	1.2246	0.2513	0.9945	1.0867
160.00 0.5982	0.9772	1.1893	0.2400	0.9767	1.0794
200.00 0.6075	0.9476	1.1574	0.2393	0.9118	1.0776
X = 0.6040	1.0540	1.2492	0.2511	1.0545	0.9937
S = 0.0129	0.0705	0.0564	0.0091	0.0863	0.1437

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.

SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page 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:

Where:

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

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

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound

Ais = Area of associated internal standard

:		Calibration	9		Average RRF	Reported	Recalculated	Reported	Recalculated
# -	Standard ID B6999	Date 04/28/10	Compound (Reference IS) 1,4-Dioxane (Is	(1S1)	(Initial RRF) 0.6040	(CC RRF) 0.5650	(CC RRF) 0.5650	%D 6.5	%D 6.5
			Naphthalene (19	(182)	1.0540	1.0377	1.0377	1.5	1.5
			Fluorene (19	(183)	1.2492	1.2409	1.2409	2.0	0.7
			Hexachlorobenzene (19	(184)	0.2511	0.2503	0.2503	6.0	0.3
			Chrysene (IS	(185)	1.0545	1.0636	1.0636	6.0	6.0
			Benzo(a)pyrene (IS	(98)	0.9937	1.0956	1.0956	10.3	10.3

Compound (Reference IS)	(S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	334458	295989
Naphthalene	(182)	40/80	2395908	1154469
Fluorene	(183)	40/80	1716932	691784
Hexachlorobenzene	(184)	40/80	522947	1044645
Chrysene	(185)	40/80	2349414	1104427
Benzo(a)pyrene	(981)	40/80	2348183	1071675

LDC #: \\ \frac{\gamma_3 | 4 \gamma \delta_2 \alpha \\ \text{SDG #: \\ \frac{\cuper}{\cuper} \end{array}

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof_1_
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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: # |

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	81.137	8)	٤)	0
2-Fluorobiphenyl		84.73	85	8'5	
Terphenyl-d14		91. 99	92	92	
Phenol-d5	120	128.031	85	85	
2-Fluorophenol		122.076	81	8)	
2,4,6-Tribromophenol		147.607	18	98	
2-Chlorophenol-d4					1
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl			1		
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#: 22/62 224 SDG #: See Corer

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

Reviewer:__ 2nd Reviewer:_

Page: Lot 1

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

Where: SSC = Spike concentration SA = Spike added

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

N- 91/21961 -080 571 LCS/LCSD samples:

	las.	ike	aS	Spike		GS	10	csp	/SJ	CS/I CSD
Compound	Added (// k)	7 ed .	Concer (44	Concentration	Percent Recovery	Recovery	Percent Recovery	Recovery	R	RPD
	SOL	J I CSD	l Cs	U I CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	25.60	ΛĀ	2/50	Λ/A	84	<i>h</i> }				
Pentachlorophenol										
Pyrene	2560	¥	2180	ΨY	85	8				
			- PARENT PROPERTY OF THE PROPE							
								1		

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.

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VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof_1_
Reviewer:	J16
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METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

(Y)	N	N/A
Y	M	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?

Conce	ntratio	$n = \frac{(A_{s})(I_{s})(V_{s})(DF)(2.0)}{(A_{s})(RRF)(V_{s})(V_{s})(%S)}$	Example:
A_{\star}	=	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	1000 40 VIAI VION
l _s	=	Amount of internal standard added in nanograms (ng)	Conc. = $(5\%0.05)(40)(1 \text{ m/})(100)(1)$
V_{o}	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	_ 283.06
V_{i}	=	Volume of extract injected in microliters (ul)	= 209.00
V_{t}	=	Volume of the concentrated extract in microliters (ul)	0. 3.00 /
Df	=	Dilution Factor.	3 280 mg/kg
%S	=	Percent solids, applicable to soil and solid matrices only.	U

2.0	= Factor of 2 to account	t for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
				-	
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Water

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-2

Sample Identification

EB-04142010-RIG1-RZC EB-04142010-RIG2-RZC

Introduction

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

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

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

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 (r²) 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
MB280-11305/1-A	4/16/10	Di-n-octylphthalate	1.65 ug/L	All samples in SDG 280-2448-2

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:

Compound Sample TIC (RT in minutes)		Reported Concentration	Modified Final Concentration	
EB-04142010-RIG1-RZC	Di-n-octylphthalate	1.6 ug/L	1.6U ug/L	

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Di-n-octylphthalate	1.6 ug/L	No associated samples in this SDG
EB-04142010-RIG2-RZC	4/14/10	Bis(2-ethylhexyl)phthalate	1.1 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 280-2448-2	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 280-2448-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-2	EB-04142010-RIG1-RZC EB-04142010-RIG2-RZC	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 280-2448-2

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2448-2	EB-04142010-RIG1-RZC	Di-n-octylphthalate	1.6U ug/L	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2448-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

DC #: 23162F2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2448-2	Stage 2B
_aboratory: Test America	•

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	Page:_	1	of_	1
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2nd	Reviewer:		ا س	_

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 /14 /10
II.	GC/MS Instrument performance check	A	,
111.	Initial calibration	À	7 KID W COU/IN 4252
IV.	Continuing calibration/ICV	A	COV/100 1252
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	Les 16
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	Α	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB = 1, 2

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water

	-0101			 	
1	EB-04142010-RIG1-RZC	11	21	31	
2	EB-04142010-RIG2-RZC	12	22	32	
3	MB 280- 11305/1-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
l. 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**	ກດນ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)กินดาลทthene	WWW.

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

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LDC#:	SDG #:

VALIDATION FINDINGS WORKSHEET

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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?
METHOD: GC,	Please see qua	Y N N/A

Was a method blank analyzed for each concentration preparation level? Y N N/A Was a method blank associated with every sample?

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

Blank extraction date: 4 16 10 Blank analysis date: 4 20 10

 $(\gamma \gamma)$ =

Associated Samples: Blank ID Sample Identification
MB 280-11305/A-A
1.6 /4

Blank extraction date:

Blank analysis date:

li		 			
100 m					
	Sample Identification				
	Sample				
amples:					
Associated Samples:					-
A					
	Blank ID				
	Compound				
Conc. units:	Con				

5x Phthalates 2x all others

LDC#: 23/62 FX SDG#: Were field blanks identified in this SDG?

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

VALIDATION FINDINGS WORKSHEET

Field Blanks

/ of /

Page:

2nd Reviewer: Reviewer:

AMA Sample Identification Associated Samples: 出 Were target compounds detected in the field blanks?

Sampling date: 4/4 //o Field blank type: (circle one) Field Blank / Rinsate / Other. Blank ID 十下下 EFE Compound

Associated sample units:_ Sampling date: Blank units:

CROL

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

Associated Samples:

	_			 	 	
ion						
Sample Identification						
S						
			-			
Blank ID						
punc		-				
Compound						CROL

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-4

Sample Identification

SSAK4-01-1BPC

RSAK4-3BPC

SSAL2-01-1BPC

SSAL2-01-2BPC

SSAL4-01-1BPC

SSAK5-01-1BPC

SSAP3-01-1BPC

SSAO4-01-1BPC

SSA06-01-1BPC

SA106-3BPC

SSAP3-01-1BPCMS

SSAP3-01-1BPCMSD

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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.

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Di-n-octylphthalate	1.6 ug/L	SSAP3-01-1BPC SSAO4-01-1BPC SSAO6-01-1BPC SA106-3BPC
EB-04142010-RIG2-RZC	4/14/10	Bis(2-ethylhexyl)phthalate	1.1 ug/L	SSAP3-01-1BPC SSAO4-01-1BPC SSAO6-01-1BPC SA106-3BPC

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

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04072010-RZD (from SDG 280-2216-2) 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-04072010-RZD	4/7/10	Bis (2-ethylhexyl) phthalate	2.2 ug/L	SSAK4-01-1BPC RSAK4-3BPC SSAL2-01-1BPC SSAL2-01-2BPC SSAL4-01-1BPC SSAK5-01-1BPC

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-4	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2448-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-4	SSAK4-01-1BPC RSAK4-3BPC SSAL2-01-1BPC SSAL2-01-2BPC SSAL4-01-1BPC SSAK5-01-1BPC SSAP3-01-1BPC SSAO4-01-1BPC SSAO6-01-1BPC SA106-3BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2448-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2448-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson T

LDC #: 23162G2a	VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2448-4	Stage 2B
Laboratory: Test America	

Date: 5/20 /10
Page: <u>1</u> of <u>1</u>
Reviewer: <u>\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \</u>
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4 /14 //b
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 ND 17
IV.	Continuing calibration/ICV	A	ca ha = 25 h
V.	Blanks	A	,
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
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	Ņ	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB-04072010- RZC (280-2280-2) EB = FB-04142010- RZG J = FB- J - RZD (280-2216-2) J = FB- J - RZG=

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected D = Duplicate

R = Rinsate FB = Field blank TB = Trip blank

EB = Equipment blank

Validated Samples:

(102

v r ·		<u> </u>					***************************************
1	SSAK4-01-1BPC	11	SSAP3-01-1BPCMS	21	MB 280- 11504 /-A	31	
2	RSAK4-3BPC	12	SSAP3-01-1BPCMSD	22	,	32	
3	SSAL2-01-1BPC	13		23		33	
4	SSAL2-01-2BPC	14		24		34	
5	SSAL4-01-1BPC	15		25		35	
6	SSAK5-01-1BPC	16		26		36	
7	SSAP3-01-1BPC	17		27		37	
8	SSAO4-01-1BPC	18		28		38	
9	SSAO6-01-1BPC	19_		29		39	
10	SA106-3BPC	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
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-Chloroisopropyl)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	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
i, 4-Methyiphenol	X, Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(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-Nitroanlline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	nnn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

LDC#: 23/62 G26

VALIDATION FINDINGS WORKSHEET Field Blanks

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

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

Y N N/A Were field blanks identified in the field blanks?

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

Blank units: 4/A Associated sample units: 20/K

Committee 4/A / P

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

2-2 Associated Samples:

4 Sample Identification XUX ک 4 N EBY Blank ID £ 存在 Compound CRaL

Associated sample units: 45 /L Blank units: 45 ${\cal N}$

Sampling date: 4

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

9-Associated Samples:

Sample Identification 2 *6 ~ Ź となる FB-04072010-RZD Blank ID y Y EFE Compound CROL

5x Phthalates 2x All others

LDC# 73/67 624 14 Col SDG#:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of Reviewer:_ 2nd Reviewer._

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

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

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 YN N/A

MS/MSD. Soil / Water.

Y N N/A	N/A	Were the MS/MSD percent recoveries (%K) and t	ercent recover	ies (%R) and the rel	מנועב אבו כבווו חוובובווו	he relative percent differences (RPD) within the QC limits?		
#	Date	QI QSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		\/\/\\	日もも	()	(25 (51-120)	()	/	No gual (MS is)
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	Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Ä.	Phenol	26-90%	< 35%	12-110%	< 42%	gg	GG Acenaphthene	31-137%	< 19%	46-118%	< 31%
ပ	2-Chlorophenol	25-102%	%0 5 >	27-123%	< 40%	=	4-Nitrophenol	11-114%	× 20%	10-80%	< 50%
ш	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	<u>秦</u>	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
ا.	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ë	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
ď	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	7,	ZZ. Pyrene	35-142%	< 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-6

Sample Identification

SA182-5BPC SA182-5BPCMS SA182-5BPCMSD

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 (r²) 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
MB280-11616/1-A	4/20/10	Bis(2-ethylhexyl)phthalate Dimethylphthalate	93.1 ug/Kg 29.0 ug/Kg	All samples in SDG 280-2448-6

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
SA182-5BPC	Bis(2-ethylhexyl)phthalate	96 ug/Kg	96U ug/Kg

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Di-n-octylphthalate	1.6 ug/L	All samples in SDG 280-2448-6
EB-04142010-RIG2-RZC	4/14/10	Bis(2-ethylhexyl)phthalate	1.1 ug/L	All samples in SDG 280-2448-6

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

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 280-2448-6	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 280-2448-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-6	SA182-5BPC	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 280-2448-6

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2448-6	SA182-5BPC	Bis(2-ethylhexyl)phthalate	96U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2448-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-6

No Sample Data Qualified in this SDG

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	Honox Northgate Henderson	
LDC #: 23162H2a	VALIDATION COMPLETENESS WORKSHEET	
SDG #: 280-2448-6	Stage 2B	
Laboratory: Test America	_	Re

eviewer: 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 / A / Mo
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	7. KSD (Y
IV.	Continuing calibration/ICV	A	cov/10x = 25 2
V.	Blanks	SW	
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	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	_SN)	FB = FB-04072810 R2C (280-2280-2)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

R = Rinsate FB = Field blank

ND = No compounds detected D = Duplicate - RIG1-RZC (280-2448-2)

TB = Trip blank EB = Equipment blank

Validated Samples:

(:02

	3011				
1	SA182-5BPC	11	21	31	
2	SA182-5BPCMS	12	22	32	
3	SA182-5BPCMSD	13	23	33	
4	MB 280-11616/1-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	

VALIDATION FINDINGS WORKSHEET

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

A. Phenot**	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-buty(phthalate	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	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	vw.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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LDC #:

SDG #:

VALIDATION FINDINGS WORKSHEET

Blanks

Page: Reviewer: 2nd Reviewer:

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

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

Y N N/A

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

Was the blank contaminated? If yes, please see qualification below. In date: 4/20/6 Blank analysis date: 4/22/6

ΙV 120/10 Blank analysis date: Slank extraction date: 4/

(19)

Associated Samples: A '1	Sample Identification		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
		ME 280-11616 1-A					
	Blank ID	MB 180-	93.1	29.0			
Conc. units: Mg / L	Compound	-	14年	3			

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

Associated Samples:

tion				
Sample Identification				-
S				
Blank ID				
Compound				

5x Phthalates 2x all others

LDC# 23162 HJA See Con SDG#:

VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer:_ 2nd Reviewer:

Field Blanks

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

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

Sampling date: 4 /4 10 Y N N/A

Sampling date:

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

Associated Samples:

Sample Identification S B 1420 10- RTG1-RZG RTG21 下たア <u>-</u>: 10-64 Blank ID EBI 岛 工工 色など E A Compound

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

- 6		 			 -	
	no					
mples:	Sample Identification					
Associated Samples:	Sar	£				
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ner:						
Rinsate / Oth			,,,			
Field Blank /	Blank ID					
Field blank type: (circle one) Field Blank / Rinsate / Other:	Compound					
Field						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 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-7

Sample Identification

RSAL2-7BPC SSAN6-01-3BPC

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.

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Di-n-octylphthalate	1.6 ug/L	SSAN6-01-3BPC
EB-04142010-RIG2-RZC	4/14/10	Bis(2-ethylhexyl)phthalate	1.1 ug/L	SSAN6-01-3BPC

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

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Sampling Field Blank ID Date		Compound	Concentration	Associated Samples		
FB-04072010-RZD 4/7/10		Bis(2-ethylhexyl)phthalate	2.2 ug/L	RSAL2-7BPC		

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 not within QC limits. Since there were no associated samples, no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-7	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 280-2448-7

SDG Sample		Compound	Flag	A or P	Reason (Code)	
280-2448-7	RSAL2-7BPC SSAN6-01-3BPC	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 280-2448-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2448-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-7

No Sample Data Qualified in this SDG

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LDC #:	23162l2a	VALIDATION COMPLETENESS WORKSHEET	Date: 5/20 /60
SDG #:_	280-2448-7	_ Stage 2B	Page: lof /
Laborato	ry: Test America		Reviewer: JVC
			2nd Reviewer:

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 /A /ro
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 ASD 12 COV/101 = 25 2
IV.	Continuing calibration/ICV	A	cov/10 = 25 2
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	SA 175-5BPC (No asstill cample, No gual)
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Α	
XVI.	Field duplicates	N	
XVII.	Field blanks	SM	FB = FB-04072010. RZC (280-2280-2) EB = FB - 64142010 - RIGH- L = FB - L - RZD (280-2216-2) L = FB - L - PIGZ

N = Not provided/applicable SW = See worksheet

TB = Trip blank

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples:

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1	RSAL2-7BPC	11	21		31	
2	SSAN6-01-3BPC	12	22	 ;	32	
3	MB 280-11854/1-A	13	23	 	33	
4	,	14	24		34	
5		15	25		35	
6		16	26		36	
7		17	27		37	
88		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
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-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. Benzolc Acid
I. 4-Methyiphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine⁵	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**	. חחת
N. 2-Nitrophenoi**	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# 23/62 124 See SDG #:_

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: lof Reviewer: 2nd Reviewer:

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

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

**Now N/A Were target compounds detected in the field blanks? Blank units: \(\sigma \) / L Associated sample units: \(\sigma \) / L Sampling date: \(\frac{4}{4} \langle \) / \(\frac{1}{12} \rangle \)

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

(AN) Associated Samples: E

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Sample Identification							
Sal						-	
			-		- R2C	- RIG2- RZC	
BIK iD	٨		+		EB1= EB-0414 2010-RIG1- R2C	- RIG	
Blank ID		1, 6			FB- 0414	eb- L	
		FFF	233		EB1=	E 82 = EB -	
Compound							
							CRQL

(ND)	
Associated Samples:	
d sample units: ^{५९} /८९ LBlank/ Rinsate / Other:	
Associated	i i
Blank units: Ug / Assonabling date: 4 / Eleid blank type: (circle one	•

Compound	Blank ID		Sa	Sample Identification	uo		
	FB-04672010-RZD	0- RZD					
£££	EEE 2.2						:
				<u> </u>			
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 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-8

Sample Identification

SSAL2-01-3BPC

SSAL2-01-3BPCMS

SSAL2-01-3BPCMSD

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 (r²) 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 280-2448-8

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 compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-8	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 280-2448-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-8	SSAL2-01-3BPC	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 280-2448-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-8

No Sample Data Qualified in this SDG

Tronox Northqate Henderson

LDC #:	23162J2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:_	280-2448-8	Stage 2B
Laborato	ry: Test America	<u>*</u>

Date:	5/20/10
Page:_	$\log 1$
Reviewer:	JYC
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
<u>l.</u>	Technical holding times	A	Sampling dates: 4 / a //o
II.	GC/MS Instrument performance check	A	
Ш.	Initial calibration	Α	2 KSD r
IV.	Continuing calibration/ICV	A	ca/w = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	lcs
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	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	5B = EB -04142010 - RFG1 - RZC FB = FB -04072010 - REGINERAL Communication 250-2210

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:

	501			
1	SSAL2-01-3BPC	11	21	31
2	SSAL2-01-3BPCMS	12	22	32
3	SSAL2-01-3BPCMSD	13	23	33
4	MB 280-12261 /-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. 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-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. Anline
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. Butyibenzyiphthalate	PPP. Benzoic Acid
I. 4-Methyiphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propyiamine*	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.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

23.162 128 LDC #:_ SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

ot	376	2
Page:	Reviewer:	2nd Reviewer:

WETHOD: 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: 49 /L Associated sample units:

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

= Ł

(4 N) Sample Identification Associated Samples: FB-040720 10-Blank ID EEE Compound CRQL

units:	
sample	
Associated	
k units:	
ınk ur	

Field blank type: (circle one) Field Blank / Rinsate / Other:	e) Field Blank	/ Rinsate / Other:	Associated Samples:	amples:		1
Compound	Blank ID		S	Sample Identification		
					:	
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 14, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-10

Sample Identification

RSAL2-8BPC

RSAL2-9BPC

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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
4/28/10	Benzo(g,h,i)perylene	25.7	All samples in SDG 280-2448-10	J- (all detects) UJ (all non-detects)	Α

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
MB280-12617/15-A	4/26/10	Bis(2-ethylhexyl)phthalate	119 ug/Kg	All samples in SDG 280-2448-10

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
RSAL2-8BPC	Bis(2-ethylhexyl)phthalate	160 ug/Kg	160U ug/Kg
RSAL2-9BPC	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U 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 280-2448-10

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 280-2448-10	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 280-2448-10

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-10	RSAL2-8BPC RSAL2-9BPC	Benzo(g,h,i)perylene	J- (all detects) UJ (all non-detects)	Р	Continuing calibration (%D) (c)
280-2448-10	RSAL2-8BPC RSAL2-9BPC	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 280-2448-10

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2448-10	RSAL2-8BPC	Bis(2-ethylhexyl)phthalate	160U ug/Kg	А	bl
280-2448-10	RSAL2-9BPC	Bis(2-ethylhexyl)phthalate	140U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-10

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23162L2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2448-10	Stage 2B
Laboratory: Test America	

Page: 1 of Reviewer: V6 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 /4 /10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	SW	2 RSD 12 COV/W = 257
V.	Blanks	SW)	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	И	Client suc
VIII.	Laboratory control samples	Α	Client spec US
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	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	SMS	FB = FB - 04072010 - RZD (from 280-2216-2)

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

R = Rinsate

ND = No compounds detected

FB = Field blank

D = Duplicate (both TB = Trip blank

EB = Equipment blank

Validated Samples:

Casil

	2011		 		
1	RSAL2-8BPC	11	21	31	
2	RSAL2-9BPC	12	22	32	
3	MB 280 - /2617 15-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-Dichlorophenot**	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-Methylphenot	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-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**	ົດກາດ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer: Reviewer:

SDG #: Scr Cn SmETHOD: GC/MS BNA (EPA SW 846 Method 8270C)

A'N K

LDC# 23/62/29

Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

*		Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	4/28/10	\$6999	(-) 777	25.7		411	J-MTA (C)
L_							
					:		
<u> </u>							

12 129	Car'
1162	25
LDC #:_	SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

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Page: Reviewer:	2nd Reviewer:

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

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	d "N". Not applicable questions are identified as "	
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N N 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?

 $\frac{\sqrt{N N/A}}{8}$ Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $\frac{1}{2} \frac{\sqrt{26}}{\sqrt{6}} \frac{\sqrt{6}}{8} \text{Blank analysis date: } \frac{1}{2} \frac{\sqrt{26}}{\sqrt{6}} \frac{\sqrt{6}}{6}$

(79)

Sample Identification 4 Associated Samples: 140/4 160 MB 280-12617/15-A Blank ID 19 EEE Compound Conc. units:_

Blank analysis date: Blank extraction date: _______Conc. units: ______

Associated Samples:

	Sample Identification					
THE PROPERTY AND ADDRESS OF THE PROPERTY A						
		:				
	Blank ID					
	Compound					
	Con					

5x Phthalates 2x all others

VALIDATION FINDINGS WORKSHEET

LDC# 23/62 L2a

SDG #:

Field Blanks

of	3/4	}
Page:	Reviewer:	2nd Reviewer:

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

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

Were target compounds detected in the field blanks?

Were target compounds detected in the field blanks?

Associated sample units: 45 /ks **Blank units:**

Sampling date: 4 /67 /10

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

- X Sample Identification Associated Samples: 5/X 78 200 FB-04672010-RZD Blank ID せれた Compound CRQL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

Associated Samples:

	ation		-		
Jallipies.	Sample Identification				
Associated Salliples.					
Ounci.					
IN / INITIOATE /					
וכן ו וכות טומו	Blank ID				· 4.
rela plant type. (circle one) i icia plant, i misate i onei:	Compound				
ו וכות מומווע ל	Con				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 15 through April 16, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-4

Sample Identification

SSAK8-02-1BPC SA129-3BPC

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
MB280-11616/1-A	4/20/10	Bis(2-ethylhexyl)phthalate Dimethylphthalate	93.1 ug/kg 29.0 ug/Kg	All samples in SDG 280-2500-4

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
SSAK8-02-1BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SA129-3BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	110 ug/Kg 40 ug/Kg	110U ug/Kg 40U ug/Kg

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	SSAK8-02-1BPC
FB-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	SA129-3BPC

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 compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2500-4	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2500-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-4	SSAK8-02-1BPC SA129-3BPC	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 280-2500-4

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2500-4	SSAK8-02-1BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	bl
280-2500-4	SA129-3BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	110U ug/Kg 40U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2500-4

No Sample Data Qualified in this SDG

Tronox Northqate Henderson

_DC #: 23162N2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2500-4	Stage 2B
_aboratory: <u>Test America</u>	

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: 4/15 - 16 /o
И.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD 12 COV/N 6 25 21
IV.	Continuing calibration/ICV	A	COV/OV £ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	SA 182 - 5BPC
VIII.	Laboratory control samples	A	ics
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	Ŋ	
XVII.	Field blanks	SM .	FB = FB-04072010-RZD (280-2216-2) FB = FB-04132010-RZG2-RZE (280-2400-2400-2400-2400-2400-2400-2400-2

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected R = Rinsate

FB = Field blank

FB-04132010- RZG2 -RZE (780-2400-2)

TB = Trip blank

EB = Equipment blank

Validated Samples:

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	3011				 	
1	SSAK8-02-1BPC	11	2	21	31	
2	SA129-3BPC	12		22	32	
3 ⁺	MB 280-11616 /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. 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-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene™	T. 4-Chloroaniline	II, 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2"-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
i. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	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-ethylhexy!)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate™	nnn
N. 2-Nitrophenol**	CC. Dimethyiphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	۸۸۷.
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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SDG #: Lee Con

VALIDATION FINDINGS WORKSHEET

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Reviewer:	2nd Reviewer:

Page: 1 of 1

Blanks

METHOD: G	METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see q	jualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
V N N/A	YNA Was a method blank analyzed for each matrix?
Y N/A	Was a method blank analyzed for each concentration preparation level?
V/N N/ >	Was a mothod blank associated with even sample?

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: 4/20/p Blank analysis date: 4/22/p

(79) Sample Identification ΑV Associated Samples: 2 5 d 40, 2 2 Mb 280-11616/-A Blank ID 29.0 93. 日子上 Compound Conc. units:

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

Associated Samples:

5x Phthalates 2x all others

LDC#: 23162 NM SDG #: 101 Care

VALIDATION FINDINGS WORKSHEET

Page:

2nd Reviewer: Reviewer:_

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

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

Alank units: W/L Associated sample units: US/L Associated Sampling date: 4 /v7/lo

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

Associated Samples:

Compound	Blank ID			Ö	Sample Identification	tion		
	F8-04672516-RZD	516-RZD						
EFE	2,2		1 > 5× FB	FB)				
CROL								
Blank units: $\frac{16}{4}$ Associated sample units: $\frac{46}{4}$	ociated samp	ple units: 49 /L				,		
Field blank type: (circle one) Field Blank Rinsate / Other.	(Field Blank	ने Rinsate / Other:		Associated Samples:	amples:	7		
Compound	Blank ID	angle reasons.		S	Sample Identification	ion		

FB-0413-2010-RIG2-RZE

FFF 印尼

5x Phthalates 2x All others

CROL

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 15, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-5

Sample Identification

SA175-5BPC SA175-5BPCMS SA175-5BPCMSD

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-04132010-RIG2-RZE (from SDG 280-2400-2) 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-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	All samples in SDG 280-2500-5

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

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. 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 280-2500-5	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2500-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-5	SA175-5BPC	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 280-2500-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2500-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23162O2a Stage 2B SDG #: 280-2500-5 Laboratory: Test America

	Date:	5/20 /c
	Page:_	<u>\</u> of
	Reviewer:	JVC
2nd	Reviewer:	V-

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 /15 /10
11.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	B RSD rx
IV.	Continuing calibration/ICV	A	ca/w = 25 }
V.	Blanks	Α	
· VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SM)	
VIII.	Laboratory control samples	Α	KS.
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	Á	
XVI.	Field duplicates	N	
XVII.	Field blanks	2M	FB = FB-04132010-RIG2-RZE (280-2410-2

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

	2011				 ,	
1	SA175-5BPC	11	21	1	31	
2	SA175-5BPCMS	12	22	2	32	
3	SA175-5BPCMSD	13	23	3	33	
4	MB 280 - 11854/1-A	14	24	1	34	
5	,	15	25	5	35	
6		16	26	3	 36	
7		17	27	7	37	
8		18	28	3	38_	
9		19	29	9	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. Anlline
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-propylamine⁴	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS, Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກກກ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	٧٧٧.
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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DC #: 2	SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

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STHOD: GC/MS BNA (EPA SW 846 Methoo	
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Were field blanks identified in this SDG? Were target compounds detected in the field blanks? We Associated sample units: $\frac{1}{2}\sqrt{k_{\chi}}$ Y N N/A

Blank units:

Sampling date:

,								
	(ND)	/						
-	#11							
	amples:	Sample Identification						
	Associated Samples:	S						
l	ther:		RZE					
	// Rinsate / O		FB-04132010-RIG2-RZE					
<u>/</u>	শু Field Blank	Blank ID	FB-0412	1.)	1.6			
Sampling date.	Field blank type: (circle one) Field Blank)/ Rinsate / Other:	Compound		莊	FFF			
samping da	ield blank t	Com						CRal

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

_		 	 	
tion				
Sample Identification				
S				
Blank ID				
punc				
Compound				CROL

5x Phthalates 2x All others

LDC#: >3 16 × 02a SDG #: Cer Cw

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of

Reviewer:_ 2nd Reviewer:

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

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

Y. N. N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated

MS/MSD, Soil / Water.

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?

<u> </u>						-					r
*	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)		RPD (Limits)	Associated Samples	i Samples	Qualifications	
		2/3	Several		ont side	11 mts)) /		No mel	
		/		ع	2 RPD(^))		(either MS, ASD	
				())	Û))]		or 4Cs him	
				())	()	(
			·	())	()) (
				(,	-	,) [
				())	^	•				_
				()))))			_
				())	,))			-
				())	()	(
				())	,)) [_
				()	J	^	•) [_
				())	()) (
				())	()	(_
				())	()	(-	
				,	`	^)	(
				())	^)) [

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Ą	Phenol	26-90%	< 35%	12-110%	< 42%	99	Acenaphthene	31-137%	< 19%	46-118%	<31%
ن	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	≕	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
ш	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	<u>秦</u>	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
7	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ë	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
œ	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	72.	Pyrene	35-142%	< 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 15, 2010

LDC Report Date:

May 28, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-6

Sample Identification

SA175-6BPC SA175-7BPC

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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
4/28/10	Benzo(g,h,i)perylene	25.7	All samples in SDG 280-2500-6	J- (all detects) UJ (all non-detects)	А

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
MB280-12617/15-A	4/26/10	Bis(2-ethylhexyl)phthalate	119 ug/Kg	All samples in SDG 280-2500-6

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
SA175-7BPC	Bis(2-ethylhexyl)phthalate	220 ug/Kg	220U ug/Kg

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	All samples in SDG 280-2500-6

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

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 280-2500-6	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 280-2500-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-6	SA175-6BPC SA175-7BPC	Benzo(g,h,i)perylene	J- (all detects) UJ (all non-detects)	Р	Continuing calibration (%D) (c)
280-2500-6	SA175-6BPC SA175-7BPC	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 280-2500-6

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2500-6	SA175-7BPC	Bis(2-ethylhexyl)phthalate	220U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2500-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ORKSHEET

LDC #: 23162P2a	VALIDATION COMPLETENESS W
SDG #: 280-2500-6	Stage 2B
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: 4/15/10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	7. RSD r
IV.	Continuing calibration/ICV	SW	ca/10 625 b
V.	Blanks	-CM	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Á	
VIII.	Laboratory control samples	A	us
lX.	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	7	
XVII.	Field blanks	SW	FB = FB-04 132010_RIG2-RZE (280-2410-2)

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

	3011		W	
1	SA175-6BPC	11	21	31
2	SA175-7BPC	12	22	32
3 M	0280- 12617/15-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-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-Dinitrophenol⁴	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine⁴	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	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	nnn
N. 2-Nitrophenoi**	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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Continuing Calibration

2nd Reviewer: Reviewer:

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

X N N/A V N/A

LDC# 23162 PM

SDG#:

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

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

U Qualifications Associated Samples Finding RRF (Limit: >0.05) Finding %D (Limit: <25.0%) 25.7 T Compound Standard ID 86999 9/84 Date 4

Psq	7
13 16 %	706
LDC#: >	SDG #:

VALIDATION FINDINGS WORKSHEET

Page: 1 of Reviewer: 2nd Reviewer:

> Prease 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?

Was a method blank associated with every sample?

Was the blank contaminated? If yes, please see qualification below. Z Blank extraction date: 4/26/6 Blank analysis date: 4

Sample Identification 7.4 Associated Samples: 220/4 4 ME 260-12-617 Blank ID <u>=</u> FEE Conc. units: 🛂

Blank analysis date: Blank extraction date:_

Associated Samples:

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

5x Phthalates 2x all others

23162 122	المالية المالية
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page:_	Reviewer:	and Doughor

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

Were field blanks identified in the field blanks?

Were target compounds detected in the field blanks?

Blank units: 19/1 Associated sample units: 16/1 / Camping date: 4/19/10

A /

Associated Samples:

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

Sample Identification ₽ FB-04132010-RIG2-RZE Blank ID و <u>`</u> _<u>-</u>-BFE FFF Compound CROL

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

Sample Identification Blank ID Compound CRal

5x Phthalates 2x All others

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 16, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2541-4

Sample Identification

SSAK5-02-1BPC

SSAK6-01-1BPC

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 280-2541-4

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

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 QC limits. Since there were no associated samples, no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2541-4	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2541-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2541-4	SSAK5-02-1BPC SSAK6-01-1BPC	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 280-2541-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2541-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23162R2a VALIDATION COMPLETENESS WO
SDG #: 280-2541-4 Stage 2B
Laboratory: Test America

Date: 5/30 /re
Page: 1 of 1
Reviewer: 5/6
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 hu /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD 12
IV.	Continuing calibration/ICV	A	COV/10 625 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	SA175-SBPC (No asstid sample, No gual)
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	c M	FB = 04072010-RZD (from 280-2216-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil

	3011				
1	SSAK5-02-1BPC	11	21	31	
2	SSAK6-01-1BPC	12	22	32	
3	MB 280- 11854 /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)

		and the second s		
A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol™	III. Benzo(a)pyrene艹
B. Bis (2-chioroethyl) ether	Q. 2,4-Dichlorophenol**	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-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
i. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	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**	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.

soc con LDC#: 23167 RZ SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of Reviewer:_ 2nd Reviewer:

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

Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Blank units: wg/L Associated sample units: wg/L Associated Sampling date: 4/67/10

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

7 Associated Samples:

FB) Sample Identification X 4 e:te Result FB- 6407 2010 - RZD Blank ID 4 五五五 Compound CROL

Associated sample units: Blank units:

Sampling date:

:						
	uc					
oles:	Sample Identification					
Associated Samples:	Sampl					
Associa						
					-	
ate / Other						
ink / Rinsa						
Field blank type: (circle one) Field Blank / Rinsate / Other:	Blank ID		:			
circle one					and the same of th	
ık type: (Compound					
Field blank type:						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 16, 2010

LDC Report Date: May 20, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2541-6

Sample Identification

SA127-6BPC SSAI3-01-3BPC SSAI3-01-3BPCMS SSAI3-01-3BPCMSD

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.

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 280-2541-6

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

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 280-2541-6	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 280-2541-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2541-6	SA127-6BPC SSAI3-01-3BPC	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 280-2541-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2541-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ORKSHEET

LDC #:	23162S2a	VALIDATION COMPLETENESS W
SDG #:_	280-2541-6	Stage 2B
Laborato	ry 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
l.	Technical holding times	A	Sampling dates: 4/10 /10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	70 KSD r
IV.	Continuing calibration/ICV	A	ca/10 = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	-	ıcs
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 (from 280-22163)

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

Valida	ated Samples:				
1	SA127-6BPC	11	21	31	
2	SSAI3-01-3BPC	12	22	32	
3	SSAI3-01-3BPCMS	13	23	33	
4	SSAI3-01-3BPCMSD	14	24	34	
5	MB 280-12001/6-A	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-chioroethyl) ether	Q. 2,4-Dichlorophenol**	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-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
l. 4-Methylphenot	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyi alcohol
J. N-Nitroso-di-n-propylamine⁴	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA, 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Ntroaniline	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.

LDC#: YOLOYSYA SDG #: 1ce Con

VALIDATION FINDINGS WORKSHEET

Field Blanks

	/
rage: Reviewer:	100000000000000000000000000000000000000

(M) _ _ _ Sample Identification Associated Samples: Were field blanks identified in this SDG?

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: 4 67 (2)

Sampling date: 4 67 (2)

Field blank type: (circle one) Field Blank / Rinsate / Other: FB-04072010-RZD Blank ID 2.2 比比 Compound

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

Associated sample units:

Blank units:

CRQL

Compound	Blank ID	Sar	Sample Identification	ď		
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CROL	-					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 16, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2541-8

Sample Identification

RSAK5-9BPC

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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
4/28/10	Benzo(g,h,i)perylene	25.7	All samples in SDG 280-2541-8	J- (all detects) UJ (all non-detects)	Α

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
MB280-12617/15-A	4/26/10	Bis(2-ethylhexyl)phthalate	119 ug/Kg	All samples in SDG 280-2500-4

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
RSAK5-9BPC	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U 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 280-2541-8

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 280-2541-8	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 280-2541-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2541-8	RSAK5-9BPC	Benzo(g,h,i)perylene	J- (all detects) UJ (all non-detects)	А	Continuing calibration (%D) (c)
280-2541-8	RSAK5-9BPC	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 280-2541-8

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2541-8	RSAK5-9BPC	Bis(2-ethylhexyl)phthalate	140U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2541-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET LDC #: 23162T2a Stage 2B SDG #: 280-2541-8 Laboratory: Test America

Page: 1 of_ Reviewer: 34 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	Α	Sampling dates: 4 /16 /10
H,	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD +~
IV.	Continuing calibration/ICV	SW)	CON /ON = 250
V.	Blanks	SN)	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Went spec
VIII.	Laboratory control samples	A	tcs
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	SM	FB = FB-04072010-RZD (from 280-2216-3)

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:

1102

	3011		 	 	
1	RSAK5-9BPC	11	21	31	
2	MB 280-12617/15+	-12	22	32	·
3	,	13	23	33	
4		14	 24	34	
5		15	25	35	
6		16	26	36	
7		17	27	 3 7	
8		18	28	38	·
9		19	29	39	
10		20	30	40	

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol™	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene™	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol™	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	ТТТ.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate	nnn
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	۸۸۷.
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

Page: 1 of

Reviewer:_ 2nd Reviewer:

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

See Card

SDG#:

LDC# 73 162 T22

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

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

M/N N/W

F	Date	Standard ID	Compound	Finding %U (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	0/81/2	BC 999	(-) 111	25.7		AN	(2) WIN/-5
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VALIDATION FINDINGS WORKSHEET Blanks

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Page:	Reviewer:	2nd Reviewer:

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

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qualifications below

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? Y N N/A

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation levery sample?

Was a method blank associated with every sample?

Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 1/26/10 Blank analysis date: 1/28/10

(88) Sample Identification 41 Associated Samples: 4 MB 280-14617/15-A Blank ID 方式 Compound Conc. units:_

Blank analysis date: Blank extraction date:______Conc. units:_____

Conc. units:		Associated Samples:
Compound	Blank ID	

5x Phthalates 2x all others

: T29	200
23/62	205
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page:	of)	9/0	1
	Page:	Reviewer:	2nd Reviewer:

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

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

Blank units: Work parget compounds detected in the field blanks?

Sampling date: 4 17 / 0

Blank units:

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

=

Sample Identification Associated Samples: 2 ž 722 t Ŷ FB-04072010- RZD Blank ID 2,7 元代 Compound CRQL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

Associated Samples:

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Compound	Blank ID			Sam	Sample Identification	ion		
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 21, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2699-1

Sample Identification

SSAK7-03-1BPC

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 280-2699-1

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 compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2699-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2699-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2699-1	SSAK7-03-1BPC	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 280-2699-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2699-1

No Sample Data Qualified in this SDG

Tronox Northqate Henderson T

LDC #:	23162U2a	VALIDATION COMPLETENESS WORKSHEE
SDG #:	280-2699-1	Stage 2B
Laboratory	/: Test America	

Page: 1 of Reviewer: 34 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	<u> </u>	Sampling dates: 4 /21 /16
II.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	Α	ca /w = 25]
V.	Blanks	A	
, VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Á	SSAL 2-01-3BPC
VIII.	Laboratory control samples	A	ιςς
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N_	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Ą	
XVI.	Field duplicates	λ	
XVII.	Field blanks	SW	F8: FB-04672010-R2D (from 280-2216-2)

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Call

	3011			 	
1	SSAK7-03-1BPC	11	21	31	
2	MB 280- 12261 1-A	12	22	32	
3		13	23	33	
4		14	24	34	
5		15	25	 35	
6		16	26	36	
7		17	27	 37	
8		18	28	 38	
9		19	29	 39	
10		20	30	 40	

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT, Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	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-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-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™	กกก
N. 2-Nitropheno!**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	٧٧٧.
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.

ИЗД	}
67	7
2	4
LDC #:_	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

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Page:	Reviewer:	2nd Reviewer:

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

Were field blanks identified in this SDG?

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

Blank units: 1/2 / L Associated sample units: 1/5 / R Y N N/A

Sampling date: 4 /67 /10 Field Blank) Rinsate / Other:

	ıtion					
	Sample Identification					
Associated Samples.	S					
Associa						
III EI .						
/ Filisale / O		010-R2D				
of remaining	Blank ID	FB-040720 10-RZD	2,2			
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rield blatik type. (cilcie orie) rield elatika kilisale / Olilei.	Comp					CROL

e units:	ı
d sampl	-
Associate	
; <u>;</u>	
ak units	

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

Field blank type: (circle one) Field Blank / Rinsate / Other:	Field Blank	/ Rinsate / Other:	Associate	Associated Samples:				
Compound	Blank ID			Sar	Sample Identification	ion		
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 22, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-3

Sample Identification

SSAN7-03-1BPC

SSA07-02-1BPC

SSAL3-03-1BPC

SSAN7-03-1BPCMS

SSAN7-03-1BPCMSD

Introduction

This data review covers 5 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
4/28/10	Benzo(g,h,i)perylene	25.7	All samples in SDG 280-2771-3	J- (all detects) UJ (all non-detects)	А

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
MB280-12640/1-A	4/27/10	Bis(2-ethylhexyl)phthalate	121 ug/Kg	All samples in SDG 280-2771-3

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
SSAN7-03-1BPC	Bis(2-ethylhexyl)phthalate	150 ug/Kg	150U ug/Kg
SSAO7-02-1BPC	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg
SSAL3-03-1BPC	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg

Samples FB-04072010-RZD (from SDG 280-2216-2) 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-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	SSAL3-03-1BPC

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2771-3	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 280-2771-3

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2771-3	SSAN7-03-1BPC SSAO7-02-1BPC SSAL3-03-1BPC	Benzo(g,h,i)perylene	J- (all detects) UJ (all non-detects)	А	Continuing calibration (%D) (c)
280-2771-3	SSAN7-03-1BPC SSAO7-02-1BPC SSAL3-03-1BPC	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 280-2771-3

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2771-3	SSAN7-03-1BPC	Bis(2-ethylhexyl)phthalate	150U ug/Kg	А	bl
280-2771-3	SSAO7-02-1BPC	Bis(2-ethylhexyl)phthalate	140U ug/Kg	Α	bl
280-2771-3	SSAL3-03-1BPC	Bis(2-ethylhexyl)phthalate	140U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2771-3

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:	23162V2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2771-3	Stage 2B
Laborator	y: Test America	<u> </u>

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 /22 /16
Н.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2, K2D 12
IV.	Continuing calibration/ICV	Shi	COV /10 & 25 }
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	ις
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	Á	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB-04072010- RZC (from 280- >216-2) *FB = FB-04072010- RZC (from 280-2280-Y)

A = Acceptable Note:

N = Not provided/applicable

SW = See worksheet

YND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

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	301			 	······································
1	SSAN7-03-1BPC	11	21	31	
2	SSAO7-02-1BPC	12	22	32	
3	SSAL3-03-1BPC	13	23	33	
4	SSAN7-03-1BPCMS	14	24	34	
5	SSAN7-03-1BPCMSD	15	25	35	
6 ⁺	MB 280-12640 /1-A	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-Dichlorophenot**	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. Anlline
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. Butylbenzylphthalate	PPP. Benzoic Acid
l. 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**	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.

VALIDATION FINDINGS WORKSHEET
IDINGS V

SDG# 59162 124 SDG# 500 Cm

Page: __of__

Reviewer: 2nd Reviewer:

Prease 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) AN NA

Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Were all %D and RRFs within the validation criteria of \le 25 %D and \ge 0.05 RRF?

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Qualifications	J-115 (c)	V ,														
Associated Samples	Ρ															
Finding RRF (Limit: >0.05)																
Finding %D (Limit: <25.0%)	25.7															
Compound	(-) 777															
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VALIDATION FINDINGS WORKSHEET

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

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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?

(79) A.1 Associated Samples: Conc. units: Mg /kg

	ion						
	Sample Identification						
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Associated calliples.		٨	140/4	•			
Associat		1	n/ es1	,			
		A-1/0751-082 AM					
	Blank ID	1-087 AM	2				
colle. ullus. " " / no	, ,		EEE				
	Compound						

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

	1					I	
			-		on		
					Sample Identification		
					Sa		
						ed Samples:	
						Associate	
							is date.
					Blank ID		DIALLY ALIALYS
					punodi		
					Con	Conc. units:	HALLE EXILACITY
					punodu		IUII UALE. DIAIIN AIIAIYSIS UALE.

5x Phthalates 2x all others

LDC# 73 16 × 1/2 55 25 SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of / Reviewer:_ 2nd Reviewer:_

> Y/N N/A Were target compounds detected in the field blanks?
>
> Sampling date: 4 /2 /10 Were field blanks identified in this SDG? METHOD: GC/MS BNA (EPA SW 846 Method 8270) Y N N/A

M

Sample Identification Ħ Associated Samples: # ĸ Field blank type: (circle one) Field Blank / Rinsate / Other: -R2D FB-04672010 Blank ID 4 433 Compound CRQL

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

- 61						
	ion					
	Sample Identification					
	Sai					
	Blank ID					
	pun	The first property of the control of				
	Compound	enter de la companya				CRQL

LDC #: 23162 V24 SDG #: 500 CM

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of Reviewer:_ 2nd Reviewer.

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

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

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 Y N/A

MS/MSD. Soil / Water.

# Date MS/MSD ID 4/5	Compound					
4		MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		()	(00/-1/25) 22/	()		No gual (MSH
		()	()	()		
		()	()	()		
	·	()	()	()		
		()	()	()		
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	Compound	QC Limits (Soli)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)
ď	Phenol	26-90%	< 35%	12-110%	< 42%	99	Acenaphthene	31-137%	< 19%	46-118%	<31%
ن	C. 2-Chlorophenol	25-102%	2 50%	27-123%	< 40%	=	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
ш	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	폿	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
٦,	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ë	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
ď	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	ij	Pyrene	35-142%	< 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23162

Chlorinated Pesticides



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-1

Sample Identification

SSAM3-01-1BPC

SSAM3-01-3BPC

SSAM3-01-5BPC

SSAM3-01-7BPC

SSAM3-01-9BPC

SSAM3-01-7FD

SSAI2-01-1BPC

SSAI2-01-1BPC FD

SSAI2-01-3BPC

SSAI2-01-5BPC

SSAI2-01-7BPC

SSAI2-01-9BPC

SSAM3-01-1BPCMS

SSAM3-01-1BPCMSD

Introduction

This data review covers 14 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.

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 (r²) 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 with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
280-11136-BLK	4/15/10	4,4'-DDE	1.03 ug/Kg	All samples in SDG 280-2400-1

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SSAI2-01-1BPC	4,4'-DDE	1.5 ug/Kg	1.5U ug/Kg
SSAI2-01-3BPC (50X)	4,4'-DDE	100 ug/Kg	100U ug/Kg

Sample EB-04132010-RIG3-RZD (from SDG 280-2400-2) was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RZE (from SDG 280-2400-2) were identified as field blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAI2-01-9BPC	A B	Decachlorobiphenyl Decachlorobiphenyl	143 (63-124) 139 (63-124)	All TCL compounds	J+ (all detects)	Р

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 280-2400-1	All compounds 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 SSAM3-01-7BPC and SSAM3-01-7FD and samples SSAI2-01-1BPC and SSAI2-01-1BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)		D'#		
Compound	SSAM3-01-7BPC	SSAM3-01-7FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	6000	5800	3 (≤50)	-	-	-
4,4'-DDT	840	810	-	30 (≤390)	•	-
Hexachlorobenzene	330	330	-	0 (≤390)	-	-

	Concentra	tion (ug/Kg)	505			
Compound	SSAI2-01-1BPC	SSAI2-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	1.5	1.8U	-	0.3 (≤1.8)	-	-
4,4'-DDT	0.66	1.8U	-	1.14 (≤1.8)	-	-

	Concentra	tion (ug/Kg)		.		
Compound	SSAI2-01-1BPC	SSAI2-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
beta-BHC	8.0	5.8	-	2.2 (≤1.8)	J (all detects)	А
Hexachlorobenzene	4.8	4.0	-	0.8 (≤1.8)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2400-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2400-1	SSAI2-01-9BPC	All TCL compounds	J+ (all detects)	Р	Surrogate recovery (%R) (s)
280-2400-1	SSAM3-01-1BPC SSAM3-01-3BPC SSAM3-01-5BPC SSAM3-01-7BPC SSAM3-01-7FD SSAI2-01-1BPC SSAI2-01-1BPC_FD SSAI2-01-3BPC SSAI2-01-5BPC SSAI2-01-7BPC SSAI2-01-9BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-2400-1	SSAI2-01-1BPC SSAI2-01-1BPC_FD	beta-BHC	J (all detects)	А	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2400-1

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
280-2400-1	SSAI2-01-1BPC	4,4'-DDE	1.5U ug/Kg	А	bl
280-2400-1	SSAI2-01-3BPC (50X)	4,4'-DDE	100U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-2400-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2400-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson (SHEET

LDC #:23162B3a	VALIDATION COMPLETENESS WORK
SDG #:_ 280-2400-1	Stage 2B
Laboratory: Test America	

	ate:	5-1	8-1
Pa	age:_	(_o1	
Revie	wer:_	Po	
2nd Revie	wer:_	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\leq

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

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4 12 10
II.	GC/ECD Instrument Performance Check	A	('
Ш.	Initial calibration	A	12, %RSD
IV.	Continuing calibration/ICV	SUA	12, % RSD ICV (CCV = 200/0
V.	Blanks	5W	/
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	56	
VIII.	Laboratory control samples	T	Les
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	SW	FD=4+6,7+8
XV.	Field blanks	ND	FD=4+6,7+8 FB= FB-04072010-RZD (from SDG) FB=04132010-RZD (from SDG) FB-04132010-RZD (from SDG)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

JD = Duplicate

ID = Duplicate
TB = Trip blank
EB = Equipment blank EB = 04132010 - RIG3-RZD

(SDG FT 280-Z100-Z)

Validated Samples:

ALL SOIT 21 11 SSAI2-01-7BPC 31 SSAM3-01-1BPC 2 12 22 32 SSAM3-01-3BPC SSAI2-01-9BPC 23 33 3 SSAM3-01-5BPC 13 SSAM3-01-1BPCMS 4 24 SSAM3-01-7BPC 14 SSAM3-01-1BPCMSD 34 5 SSAM3-01-9BPC 15 25 35 16 26 36 SSAM3-01-7FD 7 27 SSAI2-01-1BPC 17 37 8 SSAI2-01-1BPC_FD 18 28 38 9 SSAI2-01-3BPC 19 29 39 SSAI2-01-5BPC 20 30 40 10

VALIDATION FINDINGS WORKSHEET

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

(10 - H-1-1- A				
A. alpha-bhC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	H.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4-DDE	11.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN

Notes:

C:\Users\rthompson\AppData\Loca\\Microsoft\\Vindows\Temporary Internet Files\Content Outlook\366E0K9Q\COMPLST-3S.wpa

LDC #. 23/62/834 SDG #: See Carey METHOD: XGC__ HPLC

VALIDATION FINDINGS WORKSHEET Blanks

Reviewer: 2nd Reviewer: Page:

> Was a method blank performed for each matrix and whenever a sample extraction procedure was performed? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Were any contaminants found in the method blanks? If yes, please see findings below. Was a method blank performed with each extraction batch? Were all samples associated with a given method blank? Level IVID Only ON N/A N/A N/A M N/A N N/A

(Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?

Y N अप्रिक्त Was a method blank analyzed for each analytical / extraction batch of ≤20 samples? Blank extraction date: 4 | जिल्ला विकास analysis date: ४ / 24 / 1०

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				AC STORY 72 X			
7.	<u> </u>			x C Z 24			
	Sample Identification			大りっぱ			
1		9 (sax)	100/				
		+	1.5/	}			
	Blank ID	779-94111-082	50.1				
Conc. units: (L/La	Compound		٦				
ပ္ပု							

Associated samples: ALL

	uo						
Associated samples:	Sample Identification						
Assoc	<i>S</i>					•	
						,	
Dialin alialysis date:							
Diagraph and	Blank ID						
Conc. units:	Compound						ALL CIPCI ED BESTILTS WEBE NOT CHAIR

Associated samples:

Blank analysis date:

Blank extraction date:

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

VALIDATION FINDINDS WORKSHEET

Page: Reviewer._ 2nd Reviewer:

Surrogate Recovery

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

SDG # COLOR

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

Note: Were surrogates spiked into all samples and blanks?

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

#	Date	Sample ID	Column	Surrogate Compound	%R (L	%R (Limits)	Qualifications
		1 (400x), 2 KOX	¥	Y	0	(511-65)	110 gred, dilutedout
		3 (00x), 4(200x)	P	B	0	(63-129)	1
		(5(20x) 6(200x)	g	Ф	0	(59-115)	
		9(SCX), 10 (10X)	^	B	0	1 (671-69)	À
						(,)	
						(, , , , ,	
						(,
		12	A	143 B	661	(63-124)	T+ duts/P (S)
			В	13-16	139	(\$21-E9)	7
						(,)	
						(
						()	
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) (
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1							
						()	
	Designation	ition Surrogate Compound	Sompound	Recovery Q	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	imits (Water) Comments
	A	Tetr	ylene				
	8	Decachlorobiphenyl	enyt				

LUC # 70001 1 SDG #: 510 COM

Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer. Reviewer.

A/N N/A

AN/N/A

METHOD: ★ GC HPLC
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y)N N/A

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

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

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

Qualifications	noguel	d.F.11x																							
Associated Samples	_																								
RPD (Limits)	dup to dilution	100× ()	()	()		()	()	()	()	()	()	()	()	()	()	()	()	()		()		()	()		
MSD %R (Limits)	0) 10	alules (Du = 200x	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()		()	()	()	()	()	())
MS %R (Limits)		Br ALL anall		()	()	())	()	()	()	()	()	()	()	()	()	()	()	()	()	()		()	
Compound																									
MS/MSD ID	12/14																								
#																							1	1	╣

LDC #: 25/62859 SDG #: 26/60Ner

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:

METHOD: CG HPLC Were field duplicate pairs identified in this SDG? Were target compounds detected in the field duplicate pairs?

, domesti	Concentration	Concentration (Ug/kg)	%RPD	Qualification
	4	0	Limit	Parent only / All Samples
-	0009	2800	2	
0	0/18	018	30 (4340)	JJ.
(1-	330	330	4 (5390) Did	77
3€.				
		,		

Panoamog	Concentration (4/19	(8/18)	4 L8	Quantication
	t	8	rimit.	Parent only / All Samples
7	رج/	761	0.3	
0	0.66	1.80	4//	
B	8.0	5.8	2.2	(Pt) A/Styp I
<u>1</u> 7	4.8	9,0	0.8	
	,			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

June 1, 2010

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-1

Sample Identification

SSAL3-01-9BPC**

SSAL3-02-1BPC**

SSAL3-02-3BPC**

SSAL3-02-5BPC**

SSAL3-02-7BPC

SSAL3-02-9PBC

RSAL3-1BPC

RSAL3-3BPC

RSAL3-5BPC

RSAL3-7BPC

RSAL3-9BPC

SSAL3-01-1BPC

SSAL3-01-1BPC FD

SSAL3-01-3BPC

SSAL3-01-5BPC

SSAL3-01-7BPC

RSAL3-1BPCMS

RSAL3-1BPCMSD

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 18 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r²) was greater than or equal to 0.990.

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
4/24/10	049F4901.D	A	4,4'-DDD	25.7	RSAL3-3BPC RSAL3-5BPC RSAL3-7BPC RSAL3-9BPC RSAL3-1BPCMS RSAL3-1BPCMSD	J+ (all detects)	A
4/24/10	049F4901.D	В	4,4'-DDD	22.9	RSAL3-3BPC RSAL3-5BPC RSAL3-7BPC RSAL3-9BPC RSAL3-1BPCMS RSAL3-1BPCMSD	J+ (all detects)	А

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
4/24/10	063F6301.D	В	4,4'-DDD	20.4	RSAL3-1BPC	J+ (all detects)	А

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

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

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

V. Blanks

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

Sample FB-04072010-RZD (from SDG 280-2216-2) 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. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAL3-02-7BPC	A B	Decachlorobiphenyl Decachlorobiphenyl	327 (63-124) 335 (63-124)	All TCL compounds	J+ (all detects)	P
SSAL3-02-9PBC	A B	Decachlorobiphenyl Decachlorobiphenyl	256 (63-124) 251 (63-124)	All TCL compounds	J+ (all detects)	Р

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

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

XII. Project Quantitation Limit

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

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

Sample	Compound	RPD	Flag	A or P
SSAL3-01-9BPC**	Methoxychlor	50	J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-1	All compounds 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

Samples SSAL3-01-1BPC and SSAL3-01-1BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/Kg)	555			
Compound	SSAL3-01-1BPC	SSAL3-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	7.1	5.4	<u>-</u>	1.7 (≤1.8)	-	-
beta-BHC	34	21	47 (≤50)	-	-	-
Dieldrin	0.27	0.22U		0.05 (≤1.8)	-	-
Hexachlorobenzene	1.8	1.4	-	0.4 (≤1.8)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2448-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-1	RSAL3-1BPC RSAL3-3BPC RSAL3-5BPC RSAL3-7BPC RSAL3-9BPC	4,4'-DDD	J+ (all detects)	A	Continuing calibration (%D) (c)
280-2448-1	SSAL3-02-7BPC SSAL3-02-9PBC	All TCL compounds	J+ (all detects)	Р	Surrogate recovery (%R) (s)
280-2448-1	SSAL3-01-9BPC**	Methoxychlor	J (all detects)	А	Compound quantitation and CRQLs (RPD) (dc)
280-2448-1	SSAL3-01-9BPC** SSAL3-02-1BPC** SSAL3-02-3BPC** SSAL3-02-5BPC** SSAL3-02-7BPC SSAL3-02-9PBC RSAL3-1BPC RSAL3-3BPC RSAL3-5BPC RSAL3-7BPC RSAL3-9BPC SSAL3-01-1BPC SSAL3-01-1BPC SSAL3-01-3BPC SSAL3-01-5BPC SSAL3-01-7BPC	All compounds reported below the PQL.	J (all detects)	Α	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson Т

	Tronox Hornigate Trenderson
LDC #: 23162E3a	VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2448-1	_ Stage 2B /Y combo
Laboratory: Test America	

Date: 5-18-10
Page: <u> </u>
Reviewer: 🔑
2nd Reviewer:

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

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

	Validation Area		/ /Comments
1.	Technical holding times	A-	Sampling dates: 4 14 10
11.	GC/ECD Instrument Performance Check	A	, ,
111.	Initial calibration	Á	r2, %RSD
IV.	Continuing calibration/ICV	SW	12, %PSD ICV/CCV526/U
V.	Blanks	A	/
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N A	not reviewed for stage 2B
XII.	Compound quantitation and reported CRQLs	1 5	ν
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	FD=12+13
XV.	Field blanks	M	FD=12+13 FB=FB-04072010-RZD SPGH 280-1216-2

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:

valida	ated Samples:	501				
1	SSAL3-01-9BPC	11	RSAL3-9BPC	21	31	280-11334-BLK
2	SSAL3-02-1BPC	12	SSAL3-01-1BPC	22	32	
3	SSAL3-02-3BPC	13	SSAL3-01-1BPC_FD	23	33	
4	SSAL3-02-5BPC	14	SSAL3-01-3BPC	24	34	
5	SSAL3-02-7BPC	15	SSAL3-01-5BPC	25	35	
6	SSAL3-02-9PBC	16	SSAL3-01-7BPC	26	36	
7	RSAL3-1BPC	17	RSAL3-1BPCMS	27	37	
8	RSAL3-3BPC	18	RSAL3-1BPCMSD	28	38	
9	RSAL3-5BPC	19		29	39	
10	RSAL3-7BPC	20		30	40	

_DC#: 23162E3 9 SDG#: See Cores

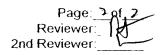
VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		c		
All technical holding times were met.	V			
Cooler temperature criteria was met				
II. GC/ECO Instrument performance check				
Was the instrument performance found to be acceptable?				
III Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	V			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations $(\%RSD) \le 20\%$?	V)		·
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	1			
Did the initial calibration meet the curve fit acceptance criteria?	V			
Were the RT windows properly established?	V	r		
Were the required standard concentrations analyzed in the initial calibration?	V			
IV. Continuing calibration				
What type of continuing calibration calculation was performed?%D or%R	i			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	/			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	/			
Was a continuing calibration analyzed daily?	1			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?		~		
Were all the retention times within the acceptance windows?	1			
V. Bianks				
Was a method blank associated with every sample in this SDG?	~			
Was a method blank analyzed for each matrix and concentration?	V			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	V			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.				
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?				
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		<i>\</i>	1	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?		1	1	
VII. Matrix spike/Matrix spike duplicates				

LDC#: 23/62E39 SDG#: See Cover

VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	V			
Was a MS/MSD analyzed every 20 samples of each matrix?	V			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		V		
VIII. Laboratory control samples	,	,	,	
Was an LCS analyzed 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 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?			1	
X. Target compound identification	· · · ·			
Were the retention times of reported detects within the RT windows?				
XI. Compound quantitation/CRQLs	1	·	1	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	-			
XII. System performance				
System performance was found to be acceptable.	1			
XIII. Overall assessment of data	1			
Overall assessment of data was found to be acceptable.	-			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	1			
Target compounds were detected in the field duplicates.	-			
XV. Field blanks				
Field blanks were identified in this SDG.	1	_		
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

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

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

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> 5469/67, "HDC" SDG # Sec COVE.

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

2nd Reviewer:_ Reviewer:_

> Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A" METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Were Evaluation mix standards run before initial calibration and before samples?

Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)?

Was at least one standard run daily to verify the working curve?

Were the retention times for all calibrated compounds within their respective acceptance windows? Did the continuing calibration standards meet the percent difference (%D) of <20.0%?

evel IVID Only

Y N'A N'A

SN N/A

Qualifications	T-105/A				3 t de 26/19A	Z	,	7+0445/A			J+ 262574												CC. 2.4'-DDD GG. Chlordane DD. 2.4'-DDE HH. Chlordane (Technical) EE, 2.4'-DDT. FF. Hexachlorobenzene
Associated Samples	1-12/12/21/21/21/21/21/21/21/21/21/21/21/2				8(-+11'11-8			+			1 912												Y. Aroclor-1242 CC 2.4'-DD Z. Aroclor-1248 DD 2.4'-DD AA, Aroclor-1254 EE, 2.4'-DD BB. Aroclor-1260 FF. Hexach
RT (Limits)	()	<i></i>	()	()	()	(()	(((()	(((().	(U. Toxaphene V. Aroclor-1016 W. Aroclor-1221 X. Aroclor-1232
%D (Limit ≤ 20.0)	H-48	76.43			25.7	22.9		20.4			50.88												Q. Endrin ketone n sulfate R. Endrin aldehyde S. alpha-Chlordane lor T. gamma-Chlordane
Compound	U	5			W	M		Ж			2												M. 44'-DDD N. Endosulfan sulfate O. 4,4'-DDT II P. Methoxychlor
Column	4	0)		4	B		B			#			-			-						I, Dieldrin J. 4.4'-DDE K. Endrin L. Endosulfan II
Standard ID	0.104F4P10		\ \		O49F4901.D	,		063F63a.D			1024F22dA	7(例2)											E. Heptachlor F. Aldrin G. Heptachlor epoxide H. Endosulfan I
# Date	1/23/10)	/ /	1/24/10	•	-	에뉴//>			(·								A. alpha-BHC B. beta-BHC C. delta-BHC D. gamma-BHC

CONCAL 3S.wpd

VALIDATION FINDINDS WORKSHEE Surrogate Recovery

Page: of C 2nd Reviewer: Reviewer:

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

SDG #: 506

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

Were surrogates spiked into all samples and blanks?

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

*	Date	Sample ID	Column	Surrogate Compound) 4%	%R (Limits)	Qualifications	
		2(10 X)	₩	B	146	(63-124)	noguel, dilot	
			Ø	B	345	(\$21-E9)	1	
						()		
		3 (lox)	#	B	09/1	(63-124)		
			ß	\mathcal{B}	09//	(63-12 ¢)		
			}			()		
		4 (5X)	#	T	1220	(K7/-53)		
			8	В	1150	(63-124)	S	
						(,)		
		5	4	8	778	(65/29)	(5) d/54mp+1	
			8	В	335	(15/29)	, ,	
)		(,)		
		9	4	₩ W	256	(<i>fl-E9</i>)	Jtougs/P (S)	
			9	В	251	(63-124)		
						(/)		
						()		
		7 (100X)	A	#	O	(63-124)	no guet of out	
			N	B	0	(59-1/5)		
			В	A	0	(\$2424)		
			7	В	0	(511-65)		
		8(10x)	#	В	292	(63-124)		
)	B	B	293	(59-115)	3	
						()		
	Designation		Surrogate Compound	Recovery O	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	-imits (Water) Comments	
	A	Tetrachloro-m-xylene	·m-xylene					
_	Ω	Decachlorobiohenyl	oiphenyl					

VALIDATION FINDINDS WORKSHEET Surrogate Recovery

Page: Lof Reviewer 2nd Reviewer:__

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

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100 ¥.

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

Were surrogates spiked into all samples and blanks?

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

#	Date	Sample ID	Column	Surrogate Compound	%R (I	%R (Limits)	Qualifications
П		9 (10x)	9	B	131	(\$7(-6 9)	no guel, dil at
						()	, / ,
		(x01) 01	4	\mathcal{D}	159	(63-124)	
			B	B	<u>/8</u> 0	(kd-69)	
\exists						()	
		14 (5x)	4	A	0	Ships Al-EDT	
			->	Ø	0	(12-67)	
			8	₩	0	(51-115)	
			P	B	0	(63-124)	7
						()	
\exists							
						(
一						()	
7						()	
\exists							
						()	
一						()	
\dashv						()	
1							
						()	
7							
1						()	
	Designation		Surrogate Compound	Recovery Q	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Limits (Water) Comments
	A	Tetrachloro-m-xylene	xylene				
	æ	Decachlorobiphenyl	henyl				

LUC # 7016 75/1 SDG # SEL COLE

VALIDATION FINDINGS WORKSHEET

2nd Reviewer.

Page: Reviewer.

Matrix Spike/Matrix Spike Duplicates

N N/A

МЕТНОD: \bigwedge \mathbf{GC}_{--} **HPLC** Plgase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N/A

Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

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

MS/MSD ID Compound %R(Limits) %R(Limits) (17/18 (Limits) // (1/18/18/18/18/18/18/18/18/18/18/18/18/18	analyes	alless thes	% Salar	9 %	RPD (Limits)	Associated Samples	Qualifications 1090e 1. Allow
<u>^</u>	<u>^</u>	`		())		*
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SDG# 23/62E37

VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: / of } Reviewer: / Cand Reviewer:

METHOD: AGC_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N/A DIVA. Did the percent difference of detected compounds between two columns./detectors <40%?

) #/stap)	*	Compound Name	Sample ID	%RPD/%D Between Two Columns/Detectors Limit (< 40%)	Qualifications
		Ð	/	0 \$1	(0/15/A (4C)
				1	

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer:_ 2nd reviewer:

Were target compounds detected in the field duplicate pairs? METHOD: GG HPLC

MANA Were field duplicate pairs identified in this SDG?

NINA Were target compounds detected in the field dup

Parent only / All Samples Qualification MIG(8.15) Limit 50 %RPD 0.05 47 0-22.0 Concentration (Vg [Kg) 5.4 4 7 0.27 34 出出 Compound D

Qualification Parent only / All Samples	%RPD
Parent only / All Samples	Limit
Qualification	%RPD

see cover

LDC #

23162E39

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Reviewer: #

Page:

EPA SW 846 Method 8081A METHOD:

0 Parameter:

Linear

Order of regression:

100	5.07E+05	Point 6		
75	3.63E+05	Point 5		
50		Point 4		
25		Point 3		
10		Point 2		
4.00	20243	Point 1	0	∢
conc	area	Points	Compound	Channel
λ	×			

Regression Output: Regression Output:	vut:	Reported	
Constant	-5273.87917	# O	
R Squared	0.99882	r^2 =	0.99900
		p(X)	a(X^2)
X Coefficient(s) 503	5037.90634		

23162839 LDC #

see cover

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

EPA SW 846 Method 8081A METHOD:

Parameter:

Order of regression:

Linear

Date	Channel	Compound	Points	× area	y conc
22 Dec-09-	∢	۵	Point 1	31286	4.00
423/10			Point 2	70148	10
<u> </u>			Point 3	180446	25
			Point 4	387388	50
			Point 5	5.78E+05	75
			Point 6	7.46E+05	100

Regression Output: Regression Output:	n Output:	Reported	
Constant	-1261.55724	= 0	
R Squared	006660	r^2 =	0.99900
		b(X)	a(X^2)
X Coefficient(s)	7578.69448		

Page: of Reviewer: A

23/62E39 see cover

LDC #

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

EPA SW 846 Method 8081A METHOD:

Parameter:

Linear

Order of regression:

ý	conc	4.00	10	25	50	75	100	
×	area	46811	103279	254141	517493	7.56E+05	9.48E+05	
	Points	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	
	Compound	a						
	Channel	В						
	Date	23-Apr-10				I	1	•

Regression Output: Regression Output:		Reported	
Constant	16289.33687	= ⊃	
R Squared	0.99732	r^2 ==	0.99800
		b(X) a(X	a(X^2)
X Coefficient(s) 9578.	9578.29159		

Page: of Reviewer: 2nd Reviewer:

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Validatin Findings Worksheet Initial Calibration Calculation Verification

Method: EPA SW 846 Method 8081

LDC#: 23/62/639 SDG#: 24 COVE

Compound: O

		(λ)	×	(X^2)
Date	Column	Response	Conc.	Conc.
4/23/2010	В	25763	4	16
		61728	10	100
		155985	25	625
		317055	50	2500
		460355	75	5625
		629538	100	10000

Constant Std Err of Y Est R Squared Degrees of Freedom X Coefficient(s) 6 13E+03		1515.6283 0.9996262
		0.9996262
)	0.9996262
	q	Ф
		1.21E+00
Std Err of Coef.		
Correlation Coefficient		0.999813
Coefficient of Determination (r^2)		0.999626

LDC #: 23/62E39

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET



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

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

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

		į		i	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Cons	CFIRMS CCV	CF/Cong CCV	σ%	Φ%
-	038F38(.1)	m/ 1/2	D (OLA)	50.0	51.4	61.4	2.7	2.8
		1/18/1) 'À' O	50.0	£.44	たも	4.5	45
			(IW) a	0.05	53.0	53.0	5.9	6.5
			/ 0	50.0	1.87	1.44	3.9	3.9
7		, ,						
	D63F6301.D	-1/kz/t	$\mathbb{D}\left(dA ight)$	50.0	53.8	53.8	4.6	7.6
			n 0	0.02	175	126	5.8	5.8
			(972) I	56.0	54.6	54.6	9.1	9.)
3			\mathcal{N} o	50,0	45.9	45-9	7.8	8.7
4								
								•

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. DC # 23162E3 1 DG # Tel Cohey

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	l of	
Reviewer:	nd	
2nd reviewer:_	V	_

1ETHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

ample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	A	20,6	18.2876	11391	91	0
etrachloro-m-xylene	В	20.0	17.6024	88	88	ð
Decachlorobiphenyl	Á	20.0	28.679)	713	13	0
Decachlorobiphenyl	В	20.0	21.1570	106	106	0

ample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
etrachloro-m-xylene						
etrachloro-m-xylene						
ecachlorobiphenyl						
ecachlorobiphenyl						

ample ID:

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

ample ID:

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

lotes:		

LDC # 23161E31 SDG # 519 CAN

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of Reviewer:

2nd Reviewer:

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

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

the following calculation: %Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where

SC = Sample concentration

SSC = Spiked sample concentration SA = Spike added MS = Matrix spike

MSD = Matrix spike duplicate

MS/MSD samples:

	Spik	9)	Sample	Spike	Spike Sample	Matrix	Matrix spike	Matrix Spike Duplicate	e Duplicate	GSW/SW	ası
Compound	Addød (184)	Conc. (05/Kg)	Concer (V%/	Concentration (<i>い</i> チ/ Ag)	Percent	Percent Recovery	Percent Recovery	Recovery	RPD	D
	MS	QSW)		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gamma-BHC	1	\	7	due	A:1-	7.0					
4,4'-DDT	441	7.41	380	539	614	616	hib	0561	tebl	29	29
Aroclor 1260						•					
			-			·					
		(1 - 1 - 1	1.		-		1) 1 1-	1 - 1	000

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification VALIDATION FINDINGS WORKSHEET LDC#: 23/62/E3G SDG #: TRECOLD

Page: Of Reviewer: Nd

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

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* (SSC-SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Concentration

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

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

LCS/LCSD samples:

jamples: 280-11334-LCS

	รัก โ	pike	Spiked	Sample	הי	rcs	rc FC	TCSD	/SOT	rcs/rcsp
i	₹ 5	Adoed ((4//4))	Conce (VS)	Concentration (いろドク))	Percent i	Percent Recovery	Percent F	Percent Recovery	<u> </u>	RPD
	SOT	CSD /	SOT	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
, ,	16.7	h (4	13.5	h) U	83	83				
	16.2	n/4	13.6	7/4	18	88				
						_				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC#: 23162E39 SDG#: See Conco

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: of /	
Reviewer:	
2nd reviewer:	

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

(X)	Ν	N/A
M	Ν	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?

Example:	
Sample I.D.	 :
Conc. = (57635 + 5273 (5037.9)	.8) (10mc) (1x)
	(30.4/2) (.921)
= 4.1 vy/kg	
J. K.	

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 15, 2010

LDC Report Date:

May 28, 2010

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-1

Sample Identification

SA131-1BPC**

SA131-1BPC FD

SA131-3BPC**

SA131-5BPC

SA131-7BPC

SA131-9BPC

SA131-1BPC FDMS

SA131-1BPC FDMSD

SA131-3BPCMS

SA131-3BPCMSD

^{**}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 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

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

3

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 (r²) was greater than or equal to 0.990.

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
4/25/10	005F0501.D	A	alpha-BHC gamma-BHC beta-BHC delta-BHC Heptachlor 4,4'-DDD	25.1 26.6 26.6 25.0 27.6 24.4	SA131-1BPC** SA131-1BPC_FD SA131-3BPC** SA131-1BPC_FDMS SA131-1BPC_FDMSD SA131-3BPCMS SA131-3BPCMSD 280-11441-BLK	J+ (all detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
4/25/10	005F0501.D	В	alpha-BHC gamma-BHC beta-BHC delta-BHC Heptachlor	21.1 25.7 20.4 20.1 22.8	SA131-1BPC** SA131-1BPC_FD SA131-3BPC** SA131-1BPC_FDMS SA131-1BPC_FDMSD SA131-3BPCMS SA131-3BPCMS SA131-3BPCMSD 280-11441-BLK	J+ (all detects)	А
4/25/10	018F1801.D	А	alpha-BHC gamma-BHC beta-BHC delta-BHC Heptachlor 4,4'-DDD	23.5 23.3 23.1 21.9 25.4 21.1	SA131-5BPC SA131-7BPC SA131-9BPC	J+ (all detects)	A
4/25/10	018F1801.D	В	gamma-BHC beta-BHC	22.9 20.4	SA131-5BPC SA131-7BPC SA131-9BPC	J+ (all detects) J+ (all detects)	A

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

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

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

V. Blanks

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

Sample FB-04132010-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 several samples. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. 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

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2500-1	All compounds 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

Samples SA131-1BPC** and SA131-1BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	200	D.W.		
Compound	SA131-1BPC**	SA131-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	11000	14000	24 (≤50)	-	-	•
4,4'-DDT	7200	31000	-	23800 (≤1800)	J (all detects)	А

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2500-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2500-1	SA131-1BPC** SA131-1BPC_FD SA131-3BPC** SA131-5BPC SA131-7BPC SA131-9BPC	alpha-BHC gamma-BHC beta-BHC delta-BHC Heptachlor 4,4'-DDD	J+ (all detects)	А	Continuing calibration (%D) (c)
280-2500-1	SA131-1BPC** SA131-1BPC_FD SA131-3BPC** SA131-5BPC SA131-7BPC SA131-9BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-2500-1	SA131-1BPC** SA131-1BPC_FD	4,4'-DDT	J (all detects)	А	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23162M3a SDG #: 280-2500-1 Laboratory: Test America

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/15/10
11.	GC/ECD Instrument Performance Check	4	
Ш.	Initial calibration	A	12, 10 RSD
IV.	Continuing calibration/ICV	ASN	Ic/1014 = 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	1	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	NA	not reviewed for stage 215
XII.	Compound quantitation and reported CRQLs	h A	V
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	FD=1+2
XV.	Field blanks	ND	FB = PB-04132010-RIGZ-RZE (SDG-)

A = Acceptable Note:

ND = No compounds detected

D = Duplicate TB = Trip blank

N = Not provided/applicable SW = See worksheet

R = Rinsate _FB = Field blank

EB = Equipment blank

of -level IV Validated Samples:

	ALLSOI	1			
1	SA131-1BPC 7	11	21	31	280-11441-BLK
2 44	SA131-1BPC_FD	12	22	32	
3 44	SA131-3BPC 1	13	23	33	
4	SA131-5BPC	14	24	34	
5 ^ (SA131-7BPC	15	25	35	
6	SA131-9BPC	16	26	36	
7	SA131-1BPC_FDMS	17	27	37	
8	SA131-1BPC_FDMSD	18	28	38	(t., 10)
9	SA131-3BPCMS	19	29	39	
10	SA131-3BPCMSD	20	30	40	

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		7		
Cooler temperature criteria was met.		/		
II. GC/ECO Instrument performance check				
Was the instrument performance found to be acceptable?				
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	V			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	V			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?				
Did the initial calibration meet the curve fit acceptance criteria?				
Were the RT windows properly established?		<u>[</u>		
Were the required standard concentrations analyzed in the initial calibration?				
IV. Continuing calibration	,			
What type of continuing calibration calculation was performed?%D_or%R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	-			
Were endrin and 4,4'-DDT breakdowns < 15% for individual breakdown in the Evaluation mix standards?	4			
Was a continuing calibration analyzed daily?	-			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?		~		
Were all the retention times within the acceptance windows?	~			
V. Blanks				
Was a method blank associated with every sample in this SDG?	1			
Was a method blank analyzed for each matrix and concentration?	1			
Were extract cleanup blanks analyzed with every batch requiring clean-up?				
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes.				
Were all surrogate %R within the QC limits?		<u> </u>		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			-	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 23/62MBA SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	1 /			
Was a MS/MSD analyzed every 20 samples of each matrix?	2			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		\ <u>\</u>		
VIII. Laboratory control samples	· · · · · /	7		
Was an LCS analyzed for this SDG?	1)		
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?				h
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	\leq			
XI. Compound quantitation/CRQLs	1 ~			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?				
XII System performance				
System performance was found to be acceptable.				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		, r		
Target compounds were detected in the field duplicates.				
XV: Field blanks				
Field blanks were identified in this SDG.			h	
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

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

A. alpha-BHC	l. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	=
D gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	J.J.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2.4'-DDD	Ž.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD, 2,4'-DDE	1
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4-DDT	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NZ

2/COMPLST-3S.wpd
ernet Files\Content.Outlook\366E0K90
\\Local\\Microsoft\\\Vindows\Temporary In
C:\Users\rthompson\AppData

LDC# 23162M32 SDG #: See Comp

VALIDATION FINDINGS WORKSHEET

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Continuing Calibration

Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A". Were Evaluation mix standards run before initial calibration and before samples?

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

N N

Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)?

Was at least one standard run daily to verify the working curve? N N/A

Did the continuing calibration standards meet the percent difference (%D) of <20.0%?

Y (T) N/A Level IV/D Only Y N (VA)

Were the retention times for all calibrated compounds within their respective acceptance windows?

# Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	s)	Associated Samples	amples	Qualifications
14/23/10	OHFIYOLD !	V #		87.HT		(ALL +181	1824	$J-\mu T/4$ (c)
	(SE)	S	\name{\gamma}	×32)			,	
-	/)	(
4/15/10	2 005 F050LD	#	¥	25.1)	(1-3,7-	01	$I_{\uparrow}q\eta K/I$ (c)
2		-	Q	16.6)	(+181K		
			9	26.6))	/		
			7	15.0)	(
			W	27.6)	(
	-	}	Z.	54.4)	(
-		\$	4	21.1)	,			
			Д	£.27)	(
			8	10%)	(
			Ų	20.1)	(
			Ð	22.8)	(
,		,				(
4/25/16	018F1801.D	A	A	23.5)	(9-6		J+ dys/A (C)
-			A	23.3)		-		
			8	23.)	(
	-		<u>つ</u>	6.18))			
			الا	25.4)	(
		>	N	21.()	(
		20	A	22.9)	(
		7	В	40Z	Ú	(4
)	(
A. alpha-BHC B. beta-BHC C. delta-BHC	E. Heptachlor F. Aldrin G. Heptachlor epoxide	I. Dieldrin J. 4.4DDE K. Endrin	M 44'-DDD N Endosulfan sulfate O 44'-DDT	O. Endrin ketone in sulfate R. Endrin aldehyde S. alpha-Chlordane	etone U. Toxaphene Idehyde V. Aroclor-1016		Y. Aroclor-1242 Z. Aroclor-1248 AA. Aroclor-1254	CC 2.4DDD DD 2.4DDE EE 2.4DDT	GG. Chlordane HH. Chlordane (Technical)

VALIDATION FINDINDS WORNSHEET

Surrogate Recovery

rage: or / Reviewer: 2nd Reviewer:__

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

SDG #: See Callo

100 ¥

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

Were surrogates spiked into all samples and blanks?

Y N N/A

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

	- A - A - A - A - A - A - A - A - A - A	Did all sui logate recovertes (7017) meet me QU millins	DIII (VOV) EDIID				
*	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	mits)	Qualifications
		[(1606x), 2(1000x)	4	₩	0	(59-115)	no quel
		3 (20x), 4(10x)	<u>ا</u>	PS	0	(63-124)	1
			B	Ā	0	(511-65)	
			->	\varnothing	0	(63-124)	\mathcal{N}
						()	
						()	
						()	
						()	
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	-) (
						()	
						()	
1						()	
\exists						()	
						()	
7						()	
						()	
	Designation		Surrogate Compound	Recovery Q	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	mits (Water) Comments
	٧	Tetrachloro-m-xylene	-xylene				
	æ	Decachlorobiphenyl	henyl				

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Lof Reviewer: 2nd Reviewer._

LUC#: 121011111

METHOD: ★ GC HPLC
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

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

Qualifications	, X																								
Quí	NOGUE	7																							
Associated Samples	2	3																							
RPD (Limits)	()	()	()	()	()	((()	()	· · · · · · · · · · · · · · · · · · ·		()	()	()	()		()) (()	(((()	,
RPD (ا ا ا	X																							
MSD %R (Limits)		6))	()	()	())	()	()	()	()	(()	()	()	()	()	·	()	()	()	()	()	()	(
(S	Analyses	to ' dilution		Ó	()	(^)	((())	(())	()	(((
MS %R (Limits)	ALL A	due to		`	J))	~))	Ŭ,)))))))	<u> </u>		`	Ú		
Compound																									
	7/8	3 9/10																							
#													T												

100# 15161M3A SDG#: 100 CONP

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: 2nd reviewer:

METHOD: CG HPLC
N N/A Were field duplicate pairs identified in this SDG?
N N/A Were target compounds detected in the field duplicate pairs?

Parent only) / All Samples Qualification A 1800/21/2 Limit 50 %RPD 24 23,800 (4000 21000 Concentration (Ug/Kg) 7200 11000 Compound D

Concentration (~	%RPD	Qualification
			Parent only / All Samples
		:	
,			

23162M3A LDC # SDG#

see cover

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

> EPA SW 846 Method 8081A METHOD:

Parameter:

Linear

Order of regression:

Date	Channel	Compound	Points	× area	y conc
-32 Dec-09-	A	٥	Point 1	31286	4.00
			Point 2	70148	10
			Point 3	180446	25
			Point 4		50
			Point 5	5.78E+05	75
			Point 6	7.46E+05	100

Regression Output: Regression Output:	n Output:	Reported	
Constant	-1261.55724	= 0	
R Squared	00666.0	r^2 =	0.99900
	:		
		p(X)	a(X^2)
X Coefficient(s)	7578.69448		

Page: of Reviewer: 14

23162M3q LDC # SDG#

see cover

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

EPA SW 846 Method 8081A METHOD:

Parameter:

Linear

Order of regression:

y	4.00	10	25	50	75	100	
x area	46811	103279	254141			9.48E+05	
Points	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	
Compound	D						
Channel	В						
Date	23-Apr-10					L	

Regression Output: Regression Output:	n Output:	Reported	
Constant	16289.33687	: : 0	
R Squared	0.99732	r^2 =	0.99800
		p(X)	a(X^2)
X Coefficient(s)	9578.29159		

Page: Of 1 Reviewer: 2 Page: of Reviewer: At 2nd Reviewer:

Validatin Findings Worksheet Initial Calibration Calculation Verification

Method: EPA SW 846 Method 8081

LDC#: 23/67×22 SDG#: 220 COVE

Compound: O

			T			Ī		
(X^2)	Conc.	16	100	625	2500	5625	10000	
X	Conc.	4	10	25	50	75	100	
(λ)	Response	25763	61728	155985	317055	460355	629538	
	Column	В						
	Date	4/23/2010						

Regression	Regression Output	
Constant	S	1515.6283
Std Err of Y Est		
R Squared		0.9996262
Degrees of Freedom		
	q	Ф
X Coefficient(s)	6.13E+03	1.21E+00
Std Err of Coef.		
Correlation Coefficient		0.999813
Coefficient of Determination (r^2)		0.999626

LDC #

23162M34 see cover

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

> EPA SW 846 Method 8081A METHOD:

0 Parameter:

Order of regression:

Linear

y conc	4.00	10	25	90	75	100	
x area	20243	46429	115151	247006	3.63E+05	5.07E+05	
Points	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	
Compound	0						
Channel	A						
Date	23-Apr-10						

Regression Output: Regression Output:	Output:	Reported	
Constant	-5273.87917	= 0	
R Squared	0.99882	r^2 =	0.99900
		p(X)	a(X^2)
X Coefficient(s)	5037.90634		

Reviewer: 14 2nd Reviewer: _ Page: /

LDC#: 23162M3 a SDG#: 520 cone

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET



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

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

Where: N = 1 Initial Calibration Factor or Nominal Amount (ng) C = 1 Calibration Factor from Continuing Calibration Standard or Calculated Amount (ng)

		3			Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV (Sg)c	CFIE	CF/Cone CCV	α %	Φ%
-	005F05d.1		D (PLA)	50.0	63.3	63.3	266	26.6
		4/0/10	J, 0	50.0	56.7	£.75	1.61	134
			D (G.B)	50.0	62.8	849	25.7	7.22
			0	50,0	536	53.6	7.3	7.3
7								
ო								
		•						
4								
	-							
								•

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. DC # 23/62M3 a DG # 50 Carg

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	l_{of})
Reviewer:	nd
2nd reviewer:	'n

1ETHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

Recovery: SF/SS * 100	
ample ID:	D Wed out

Where: SF = Surrogate Found SS = Surrogate Spiked

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	A	0.02	0	0	0	Ĵ
Tetrachloro-m-xylene						
Decachlorobiphenyl	A	0.02	0	0	0	0
Decachlorobiphenyl						

ample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Fetrachloro-m-xylene						
etrachloro-m-xylene			·			
ecachlorobiphenyl						
Decachlorobiphenyl						

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

ample ID:

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

otes:		

LDC# 23/62 M2a

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer:_

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

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation: %Recovery = 100 * (SSC - SC)/SA

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

MS/MSD samples:

SC = Sample concentration

MSD = Matrix spike duplicate

Recalc.

MS/MSD RPD

Reported Matrix Spike Duplicate Recalc. Percent Recovery Reported Recalc. Percent Recovery Matrix spike Reported MSD Spike Sample Concentration 404 МS 1 / JE Sample Conc. MSD Spike Added SΕ Compound Gamma-BHC Aroclor 1260 4,4'-DDT

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#: 25/63/439 SDG#: 22 CMeV Laboratory Control Samp

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

of /	A	۷
Page:	Reviewer:	d Reviewer:
		200

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

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

% Recovery = 100* (SSC-SC)/SA Where: SSC = Spiked samp

Where: SSC = Spiked sample concentration SA = Spike added

e added

SC = Concentration

LCS/LCSD samples: 280-1144/-LCS

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

	ls	olke	Spiked	Sample	רכ	rcs	C	LCSD	/SOT	TCS/FCSD
Compound	Ad (UK	Added (US/KU)	Conce (원)	Concentration (is/K4)	Percent F	Percent Recovery	Percent F	Percent Recovery	R	RPD
) CCS	GS01	SOT	rcsp	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	15.8	n la	8-51	ગ (૯	001	00/				
4,4'-DDT	855/	n/4	8.41	৸∫ૡ	hb	dh				
Aroclor 1260						,				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 23162 n3 a SDG #: Ell Coner

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of/_
Reviewer:_	ny
2nd reviewer:_	
	\sim

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

	N	N/A
₹\	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?

Example:			
Sample I.D		0	_i
Conc. = (()	77733+5224) 037.9) ((ionL) 30.25)	(1000x) (.925)
`	9 / /ke	~	
	01.0	} "	

#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
	_				
	·				
				<u> </u>	
			11,000 45/12		

Note:	

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23162

Metals



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

May 28, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B & 4

SA128-5BPC FD

SA139-1BPCMSD

SSAO3-01-1BPCMS

SSAO3-01-1BPCMSD SA139-1BPCMS

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-1

Sample Identification

SA207-12BPC SA207-12BPC_FD SSA03-01-1BPC SSA03-01-5BPC SA04-2BPC SA04-4BPC SA04-6BPC SA04-8BPC SA09-3BPC SA09-5BPC FD

SA09-5BPC_FD SA48-3BPC SA48-5BPC SA139-1BPC

SA139-5BPC

SSAO8-01-1BPC

SSAO8-01-1BPC-FD

SSAO8-01-5BPC

SA128-3BPC

SA128-5BPC**

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 25 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, 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.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Magnesium	1.49 mg/Kg	SA207-12BPC SA207-12BPC_FD
ICB/CCB	Magnesium	8.76 ug/L	SA207-12BPC SA207-12BPC_FD
PB (prep blank)	Manganese	0.704 mg/Kg	SA139-1BPC SA139-5BPC SSAO8-01-1BPC SSAO8-01-1BPC-FD SSAO8-01-5BPC
ICB/CCB	Cobalt	0.0611 ug/L	SA139-1BPC SA139-5BPC SSAO8-01-1BPC SSAO8-01-1BPC-FD SSAO8-01-5BPC
ICB/CCB	Manganese	0.350 ug/L	SA139-5BPC

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

Samples FB-04072010-RZC (from SDG 280-2280-2), FB04062010-RZB (from SDG 280-2131-1), and FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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 280-2400-1	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 SA207-12BPC and SA207-12BPC_FD, samples SA09-5BPC and SA09-5BPC_FD, samples SSA08-01-1BPC and SSA08-01-1BPC-FD, and samples SA128-5BPC** and SA128-5BPC_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/Kg)					
Compound	SA207-12BPC	SA207-12BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Magnesium	17000	27000	45 (≤50)	-	-	<u>-</u>	

	Concentrat	ion (mg/Kg)				
Compound SA09-5BPC		SA09-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.2	3.3	3 (≤50)	-	-	-

	Concentra	tion (mg/Kg)	RPD			
Compound	SSAO8-01-1BPC	AO8-01-1BPC SSAO8-01-1BPC-FD		Difference (Limits)	Flags	A or P
Arsenic	93	93	0 (≤50)	-	-	_
Manganese	120000	110000	9 (≤50)	-	-	-
Cobalt	2800	2800	0 (≤50)	-	-	-

	Concentra	tion (mg/Kg)]			
Compound	SA128-5BPC**	SA128-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	11	11	0 (≤50)		-	-

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2400-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-1	SA207-12BPC SA207-12BPC_FD SSA03-01-1BPC SSA03-01-5BPC SA04-2BPC SA04-4BPC SA04-8BPC SA04-8BPC SA09-3BPC SA09-5BPC SA09-5BPC SA48-3BPC SA48-5BPC SA139-1BPC SA139-1BPC SA139-5BPC SSA08-01-1BPC SSA08-01-1BPC SSA08-01-5BPC SA128-3BPC SA128-3BPC SA128-5BPC_FD	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 280-2400-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2400-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B /

LDC #: 23162B4 SDG #: 280-2400-1 Laboratory: Test America

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
I,	Technical holding times	A	Sampling dates: 4/3/10
11.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analy	ysis A	
VI.	Matrix Spike Analysis	A	msp
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Mototiized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	AN	Not reviewed for ZB
XIII.	Overall Assessment of Data	F	
XIV.	Field Duplicates	SW	(1,2),(10,11),(16,17),(20,21)
XV	Field Blanks	NO	FB= FB-04012010-RZC, FB04062010-RZB, FB-04132010
ote:	A = Acceptable NE N = Not provided/applicable R	D = No compound = Rinsate B = Field blank	(280-2280-2) (280-2131-1) (280-2

**Level4 Validated Samples:

1	SA207-12BPC	11	SA09-5BPC_FD	21	SA128-5BPC_FD	31	PBS (1-13)
2	SA207-12BPC_FD	12	SA48-3BPC	22	SSA03-01-1BPCMS	32	PBS(14-21)
3	SSAO3-01-1BPC	13	SA48-5BPC	23	SSA03-01-1BPCMSD	33	•
4	SSAO3-01-5BPC	14	SA139-1BPC	24	SA139-1BPCMS	34	
5	SA04-2BPC	15	SA139-5BPC	25	SA139-1BPCMSD	35	
6	SA04-4BPC	16	SSAO8-01-1BPC	26	·	36	
7	SA04-6BPC	17	SSAO8-01-1BPC-FD	27		37	
8	SA04-8BPC	18	SSAO8-01-5BPC	28		38	
9	SA09-3BPC	19	SA128-3BPC	29		39	
10	SA09-5BPC	20	SA128-5BPC **	30		40	

Notes:	* FB=	FB-04132010-RIGA-RZE	(280-2400-2)	
		y		

SDG#: Secar

Sample Specific Element Reference

Reviewer: CR 2nd reviewer: \(\)

All circled elements are applicable to each sample.

T		
Sample ID	Matrix	Target Analyte List (TAL)
12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb(Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
3-13, 19-	2\	Al, Sb, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
14-18		Al, Sb, As, Ba, Be, Cd, Ca, Cr Co, Cu, Fe, Pb, Mg Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
QC 72,23		Al, Sb(As)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
12425		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, 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, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GFAA		Al Sh As Ba Be Cd Ca Cr Co Cu Fe Ph Mg Mn Hg Ni K Se Ag Na Tl V Zn Mo B Si CN

Comments:_	Mercury by CVAA if performed	

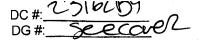
VALIDATION FINDINGS CHECKLIST

10#: 23162BY

Page: __of __ Reviewer: ____ 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
Technical holding times		100		
All technical holding times were met.				
Cooler temperature criteria was met.				
I. Calibration	1		ı	
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. Branks				
Was a method blank associated with every sample in this SDG?			_	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV. ICP Interference Check Sample			<u> </u>	
Were ICP interference check samples performed daily?		<u>† </u>		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				The state of the s
IV. Matrix spike/Matrix spike duplicates			1	
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		<u> </u>	1	T = -
Was an LCS anaylzed for this SDG?		_		
Was an LCS analyzed per extraction batch?	1	1	+-	
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: __of___ Reviewer: ____ 2nd Reviewer: ____

Validation Area	Yes	No	NA	Findings/Comments
VI. Furnace Atomic Absorbtion QC				775 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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?				
VII. ICP Serial Dilution. 64				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?	<u> </u>			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		'		
vIII Internal Standards (EPA SW 846 Method 6020)				
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?				
X. Sample Result Verification	T	T	T T	o estado de la composição de la composição Total de la composição de
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		<u></u>		
XI. Overall assessment of data:		7		Page Course
Overall assessment of data was found to be acceptable.				
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.				
XIII. Field blanks, The service of t	-		18.6	g and a graph of the second se
Field blanks were identified in this SDG.	1		_	
Target analytes were detected in the field blanks.				

Page: _of _ Reviewer: _\lambda \rightarrow _ 2nd Reviewer: _\ Reason Code: bl VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 1, 2 No Qualifiers METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) mg/Kg Action Limit 14.9 Sample Concentration units, unless otherwise noted: Maximum ICB/CCB^a (ug/L) 8.76 Maximum PB^a (ug/L) Maximum PB^a (mg/Kg) 1.49 SDG #: See Cover LDC #: 23162B4 Analyte

Associated Samples: 14-18

mg/Kg

Sample Concentration units, unless otherwise noted:

								12 mg/m				1
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	<u>. </u>			 			
ပိ			0.0611							3		
Mn	0.704			7.04								
Sample Cor	ncentration u	nits, unless o	Sample Concentration units, unless otherwise noted: mg/Kg	ed: mg/Kg		Associated Samples: 15	ımples: 1					
	· 特·格·勒·克斯克勒					a en para de la companya de la compa			The state of the s			
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers							
Mn			0.350									

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC#: 23162B4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: Reviewer:_ 2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

YN NA
Were field duplicate pairs identified in this SDG?
Were target analytes detected in the field duplicate pairs?
V:\FIELD DUPLICATES\FD_inorganic\23162B4.wpd

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	11	2	RPD	Difference	Limits	(Parent Only)
Magnesium	17000	27000	45			

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	10	11	RPD	Difference	Limits	(Parent Only)
Arsenic	3.2	3.3	3			

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	16	17	RPD	Difference	Limits	(Parent Only)
Arsenic	93	93	0			
Manganese	120000	110000	9			
Cobalt	2800	2800	0			

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	20	21	RPD	Difference	Limits	(Parent Only)
Arsenic	11	11	0			

 $\frac{23/82}{2660\sqrt{6}}$

Initial and Continuing Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

Page: of Reviewer: Q2 2nd Reviewer:

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

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

%R = Found x 100

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	46.7	0,04	107	107	}
CCUCANIA	ICP/MS (Confinuing calibation)	→	51,1	50,0	102	102	5

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.

10C# 23/62BY sugar

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

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:

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 True

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

S = Original sample concentration D = Duplicate sample concentration RPD = <u>IS-DI</u> × 100 (S+D)/2

Where,

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

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading \times 5) %D = II-SDR × 100

					Recalculated	Reported	
Samula IO	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R/RPD/%D	%R/RPD/%D	Acceptable (Y/N)
15.73	ICP interference check	A5	h.pp	100	66	8	<i>></i> -
557	Laboratory control sample		p. pl	92	()OO 1	φ	
F2	Matrix spike		(ssr-sr) J, HZ	8,02	211	115	
52/152	Duplicate		ブノン	50,3	<u></u>	9	
7	ICP serial dilution		82	8.75	*	Ò	>

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. *フロック but bash within いっぱっていまっていることのことには、*フロック but bash within いっぱっていまっていることには、 1:m: 45 = 7 00 qual 5:000 LDC #: 23/62 BY SDG #: <u>secore</u>

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: ____ of ____ Reviewer: ______ 2nd reviewer: _____

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

Y N	N/A N/A	have results neet tehotted a	ed range of the instruments and with	in the linear range of the ICP?
followi	ng equa	tion:		were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	
RD FV In. Vol. Dil %S	= = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	(100m) (S	1.02g) = 1178/kg

			<u> </u>	
Sample ID	Analyte	Reported Concentration (MG/ KG/)	Calculated Concentration (MS //CG)	Acceptable (Y/N)
20	AS		11	7
				
•				

			:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-6

Sample Identification

SSAO3-3BPC SA139-3BPC SSAO8-01-7BPC

SSA08-01-9BPC

SA128-7BPC**

SA128-9BPC**

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, 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	Cobalt	0.0354 ug/L	SSAO8-01-7BPC SSAO8-01-9BPC
PB (prep blank)	Manganese	0.125 mg/Kg	SA139-3BPC SSAO8-01-7BPC SSAO8-01-9BPC
ICB/CCB	Manganese	1.21 ug/L	SA139-3BPC SSAO8-01-7BPC SSAO8-01-9BPC

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

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No metal contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 ug/L	SSAO8-01-7BPC SSAO8-01-9BPC

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable for samples on which a Stage 4 review was performed.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2400-6	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2400-6

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-6	SSAO3-3BPC SA139-3BPC SSAO8-01-7BPC SSAO8-01-9BPC SA128-7BPC** SA128-9BPC**	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2400-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2400-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson RKSHEET

LDC #:	23162D4	VALIDATION COMPLETENES	
 SDG #:	280-2400-6	Stage 2B	
Laborator	v: Test America		/ 1

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
l.	Technical holding times	A	Sampling dates: 4/3/10
II.	ICP/MS Tune	A	·
Ш	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (SOGA 280-2131-9)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\sim	Notutilized
XI.	ICP Serial Dilution	A	(280-2131-9)
XII.	Sample Result Verification	A	(280-2131-9) Nor reviewed for ZB
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
ΧV	Field Blanks	SW	FB=FB-04072010-RZC, FB-04132010-RIGA ((280-2280-2) (280-2400-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

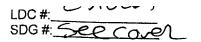
TB = Trip blank

EB = Equipment blank

Validated Samples:

	3011				
1	SSAO3-3BPC	11 PBS	21	31	
2	SA139-3BPC	12	22	32	
3	SSAO8-01-7BPC	13	23	33	
4	SSAO8-01-9BPC	14	24	34	
5	SA128-7BPC	15	25	35	
6	SA128-9BPC	16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

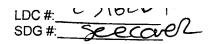
Notes:	 	
W		



Page: __of __ Reviewer: ____ 2nd Reviewer: ____

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

Metrod: Wetals (EPA SW 846 Metrod 6010/7000/6020)				· · · · · · · · · · · · · · · · · · ·
Validation Area	Yes	No	NA	Findings/Comments
1 Technical holdingsimes.	Ť	}******* ∔>	Ī	Total State of the Control of the Co
All technical holding times were met.	1			
Cooler temperature criteria was met.				
Ill Gallotetion 1 2007		I		
Were all isotopes in the tuning solution mass resolution within 0.1 amu?		<u> </u>		
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				Control of the contro
Was a method blank associated with every sample in this SDG?		ĵ		
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		_		
IV ICP/Interference/Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV. Mättixispike/Matrix spike/duplicates (
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		_		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) \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.	3 (1986) 3 (1986)			2 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	1			
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 2nd Reviewer: _____

		1	Ī	
Validation Area	Yes	No	NA	Findings/Comments
VI_EUMAGE Along Absorption oc. If MSA was performed, was the correlation coefficients > 0.995?				h in the second
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?				
VIL IGRISenal Offution				Silver Care Land
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	<u></u>			
Were all percent differences (%Ds) < 10%?	1			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		_	_	
VIII. Themat Standards (EPA/SW 846 Nethod 6020)				
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?	J			
IX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Saropie Resultiverification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		_		
XI. Overall assessment or data is a second of the second o				The specific of the specific o
Overall assessment of data was found to be acceptable.				
XII Field duplicates			13.	
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.			7	
XIII. Field blanks: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		ii		The Laboratory
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

SDG #: 250-2400-6

Sample Specific Element Reference

Reviewer: CR 2nd reviewer:

All circled elements are applicable to each sample.

	
Matrix	Target Analyte List (TAL)
- WIGUIX	
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, 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
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, (As) Ba, Be, Cd, Ca, Cr (Co) Cu, Fe, Pb, Mg (Mh), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
	Al Sh As Ba Be Cd Ca Cr Co Cu Fe Ph Mg Mn Hg Ni K Se Ag Na Tl V Zn Mo B Si CN
	Matrix

Comments:	Mercury by CVAA if performed	

LDC #: 23162D4	162D4				>	VALIDATION FINDINGS WORKSHEET	DINGS WOR	KSHEET					Page:of
SDG #: See Cover	e Cover				·	PB/ICB/CCB QUALIFIED SAMPLES	JALIFIED SA	MPLES				ď.	Reviewer: CC
METHOD:	МЕТНОD: Trace metals (EPA SW 864 Method 6010B/6020/7000)	(EPA SW 86	34 Method 60)10B/6020/7	(000	Soil preparation factor applied: 100x	ctor applied:	100x		Reason Code: bl	de: bl	2nd R	2nd Reviewer:
Sample Co	Sample Concentration units, unless otnerwise noted: mg/kg	nits, uniess (otnerwise not	ed: mg/kc		Associated Samples, 3, 4	es. 5, 4		15				5389635
												The second secon	100
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	00 G/20/9	·							
၀၁			0.0354										
Sample Co	Sample Concentration units, unless otherwise noted: mg/Kg	nits, unless c	otherwise not	ed: mg/Kg		Associated Samples: 2-4	es: 2-4						
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers								
Mn	0.125		1.21	0.121									

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 23162D4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page.

2nd Reviewer:

Field Blank: (bf)

Were target analytes detected in the field blanks? Were field blanks identified in this SDG? METHOD: Trace Metals (EPA SW846 6010B/7000)

100x

3,4 Associated Samples: Sampling date: 4/8/10 Soil fector applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other Blank units: ug/L Associated sample units: mg/Kg

												,
												3
ation			-									
Sample Identification												
Sal												
	No Qualifiers											
	Action Level											
Blank ID	2ZC 30-2)											
Analyte		co										

LDC #: 23/620 Y SDG #: SECOVER

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: Q2 2nd Reviewer:_ Page:

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

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

%R = Found x 100 True

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

Where,

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	8	Acceptable
	ICP (Initial calibration)						(NII)
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	As	41.5	9/2	10	701	2-
(O1:10)	(CU(ot.10) ICP/MS (Continuing calibation)	<u>ا</u>	0.67	560	96	98	5

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 LDC # 23/6204

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

2nd Reviewer: 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 spite calculation, Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source. %R = Found x 100

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

RPD = <u>IS-DI</u> × 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:

Where, i = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5) %D = I-SDR x 100

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found/S/1 (4mile) MR/KS	True / D / SDR (unite)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
TISAB	TSAB 10P interference check	3	7/8/101	100196	H	(0)	<u>}</u>
527	Laboratory centrol sample		0.61	072	98	X)-
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	iCP serial dilution	\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.

LDC #: 23/6209 SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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 question Have results been reported an Are results within the calibrate Are all detection limits below t	d range of the instruments and we	uestions are identifi	ied as "N/A". e of the ICP?
Detect following	ed analy ng equat	te results for	A5	were recalcula	ated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:		
RD FV In. Vol. Dil %S	=======================================	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	(100mL)(S)(1 0,885(1,0	5,47m/L)	= 8.6 mg/kg

Sample ID	Analyte	Reported Concentration (MS FS)	Calculated Concentration (MQ KQ)	Acceptable (Y/N)
<u> </u>	MS.	8.6	8.6	Ŷ
			0 = 0	
			· · · · · · · · · · · · · · · · · · ·	
				. ********************************
				· · · · · · · · · · · · · · · · · · ·
				
				· · · · · · · · · · · · · · · · · · ·

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-1

Sample Identification

RSAN6-3BPC**

SSAP3-01-1BPCMSD

RSAN6-5BPC**

SSAO6-01-5BPCMS

RSAN6-5BPC FD

SSAO6-01-5BPCMSD

SSAP3-01-1BPC**

SSAP3-01-5BPC**

SA182-3BPC**

SA182-3BPC FD

SA182-5BPC**

SSAO4-01-1BPC**

SSAO4-01-5BPC**

SA17-1BPC

SA17-5BPC

SA43-1BPC**

SA43-5BPC**

SSAO6-01-1BPC**

SSAO6-01-5BPC**

SSAO6-01-1BPC FD

SA106-3BPC**

SA106-5BPC**

SSAP3-01-1BPCMS

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 23 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, 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.

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	Magnesium	6.82 ug/L	SSAP3-01-1BPC** SSAP3-01-5BPC**
ICB/CCB	Magnesium	4.12 ug/L	SSAO6-01-1BPC** SSAO6-01-5BPC** SSAO6-01-1BPC_FD SA106-3BPC** SA106-5BPC**

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

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) 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-04142010-RIG1-RZC	4/14/10	Manganese	1.6 ug/L	SA43-1BPC** SA43-5BPC** SSAO6-01-1BPC**

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Magnesium	15 ug/L	SSAP3-01-1BPC** SSAP3-01-5BPC** SSAO6-01-5BPC** SSAO6-01-1BPC_FD SA106-3BPC** SA106-5BPC**
EB-04142010-RIG2-RZC	4/14/10	Manganese	18 ug/L	SA43-1BPC** SA43-5BPC** SSAO6-01-1BPC**
EB-04142010-RIG2-RZC	4/14/10	Magnesium	62 ug/L	SSAP3-01-1BPC** SSAP3-01-5BPC** SSAO6-01-5BPC** SSAO6-01-1BPC_FD SA106-3BPC** SA106-5BPC**

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

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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 280-2448-1	All analytes reported below the PQL.	J (all detects)	A	

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAN6-5BPC** and RSAN6-5BPC_FD, samples SA182-3BPC** and SA182-3BPC_FD, and samples SSAO6-01-1BPC** and SSAO6-01-1BPC_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)					
Compound	RSAN6-5BPC**	RSAN6-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.8	4.1	8 (≤50)	-	-	_

	Concentra	200	D.#				
Compound	SA182-3BPC**	SA182-3BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	4.3	4.6	7 (≤50)		-	•	

	Concentrat	DDD.	D:#				
Compound	SSAO6-01-1BPC**	SSAO6-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	5,6	5.4	4 (≤50)	-	-	-	
Magnesium	13000	11000	17 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2448-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-1	RSAN6-3BPC** RSAN6-5BPC-* RSAN6-5BPC_FD SSAP3-01-1BPC** SSAP3-01-5BPC** SA182-3BPC_FD SA182-3BPC-** SA04-01-1BPC** SSAO4-01-1BPC** SA17-5BPC SA17-5BPC SA43-1BPC** SA43-5BPC** SSAO6-01-1BPC** SSAO6-01-1BPC** SSAO6-01-1BPC** SSAO6-01-5BPC** SSAO6-01-1BPC-FD SA106-3BPC** SA106-5BPC**	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 280-2448-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B / U

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

280-2448-1

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
I.	Technical holding times	A	Sampling dates: 4/14/10
11.	ICP/MS Tune	AA	•
111.	Calibration	A'	
IV.	Blanks	BSV	V
V	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	IA.	
X:	Furnace Atomic Absorption QC	N	Notukiizea
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	AN	Non reviewed for ZB
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	W	(2,3),(6,1),(15,17)
XV	Field Blanks	MESW	[B=FB-04072010-RZC, FB-04B2010-RIGH (280-2280-2) (280-2400-2)

Note:

LDC #:

SDG #:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank **Level 4

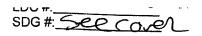
D = Duplicate

TB = Trip blank EB = Equipment blank * see below

Validated Samples:

						
RSAN6-3BPC**	11	SA17-1BPC	21	SSAP3-01-1BPCMSD	31	PB5
RSAN6-5BPC	12	SA17-5BPC	22	SSAO6-01-5BPCMS	32	
RSAN6-5BPC_FD	13	SA43-1BPC	23	SSAO6-01-5BPCMSD	33	
SSAP3-01-1BPC	14	SA43-5BPC	24	SSAG6-01-5BPCDUP	34	
SSAP3-01-5BPC	15	SSAO6-01-1BPC **	25	·	35	
SA182-3BPC	16	SSAO6-01-5BPC	26		36	
SA182-3BPC_FD	17	SSAO6-01-1BPC_FD	27		37	
SA182-5BPC **	18	SA106-3BPC **	28		38	
	19	SA106-5BPC	29		39	
SSAO4-01-5BPC	20	SSAP3-01-1BPCMS	30		40	
	SSAP3-01-1BPC SSAP3-01-5BPC SA182-3BPC SA182-3BPC_FD SA182-5BPC SSA04-01-1BPC	RSAN6-5BPC 12 RSAN6-5BPC_FD 13 SSAP3-01-1BPC 14 SSAP3-01-5BPC 15 SA182-3BPC 16 SA182-3BPC_FD 17 SA182-5BPC 18 SSAO4-01-1BPC 19	RSAN6-5BPC 12 SA17-5BPC RSAN6-5BPC_FD 13 SA43-1BPC SSAP3-01-1BPC 14 SA43-5BPC SSAP3-01-5BPC 15 SSAO6-01-1BPC SA182-3BPC 16 SSAO6-01-5BPC SA182-3BPC_FD 17 SSAO6-01-1BPC_FD SA182-5BPC 18 SA106-3BPC 19 SA106-5BPC	RSAN6-5BPC 12 SA17-5BPC 22 RSAN6-5BPC_FD 13 SA43-1BPC 23 SSAP3-01-1BPC 14 SA43-5BPC 24 SSAP3-01-5BPC 15 SSAO6-01-1BPC 25 SA182-3BPC 16 SSAO6-01-5BPC 26 SA182-3BPC_FD 17 SSAO6-01-1BPC_FD 27 SA182-5BPC 18 SA106-3BPC 28 SSAO4-01-1BPC 19 SA106-5BPC 29	RSAN6-5BPC 12 SA17-5BPC 22 SSA06-01-5BPCMS RSAN6-5BPC_FD 13 SA43-1BPC 23 SSA06-01-5BPCMSD SSAP3-01-1BPC 14 SA43-5BPC 24 SSA06-01-5BPCDUP SSAP3-01-5BPC 15 SSA06-01-1BPC 25 SA182-3BPC 16 SSA06-01-5BPC 26 SA182-3BPC_FD 17 SSA06-01-1BPC_FD 27 SA182-5BPC 18 SA106-3BPC 28 SSA04-01-1BPC 19 SA106-5BPC 29	RSAN6-5BPC 12 SA17-5BPC 22 SSAO6-01-5BPCMS 32 RSAN6-5BPC_FD 13 SA43-1BPC 23 SSAO6-01-5BPCMSD 33 SSAP3-01-1BPC 14 SA43-5BPC 24 SSAO6-01-5BPCDUP 34 SSAP3-01-5BPC 15 SSAO6-01-1BPC 25 35 SA182-3BPC 16 SSAO6-01-5BPC 26 36 SA182-3BPC_FD 17 SSAO6-01-1BPC_FD 27 37 SA182-5BPC 18 SA106-3BPC 28 38 SSAO4-01-1BPC 19 SA106-5BPC 29 39

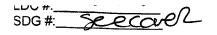
Notes:	* EB= EB-04142010-RIGI-RZC C280-2448-2)	
	EB-04142010-RIGZ-RZC	



Page: __of __ Reviewer: __v__ 2nd Reviewer: __v__

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

Wetnod: Metals (EPA SW 846 Method 6010/7000/6020)								
Validation Area	Yes	No	NA	Findings/Comments				
I. Teshnical holding times	T -	ħ	ı					
All technical holding times were met.								
Cooler temperature criteria was met.								
H/S Galibration 1999		1		The second secon				
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								
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 Interierence Check Sample								
Were ICP interference check samples performed daily?		`						
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?								
IV. Matrix spike/Matrix spike duplicates				Property of the Control of the Contr				
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			ı					
Was an LCS anaylzed for this SDG?			\perp					
Was an LCS analyzed per extraction batch?								
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?								



Validation Area	Yes	No	NA	Findings/Comments
W. Furnace/Atomic Absorption QC	47 17	140		1 munigaroommenta
If MSA was performed, was the correlation coefficients > 0.995?				7
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?				
VII. ICP Senal Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	٠			
Were all percent differences (%Ds) < 10%?	_			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
VIII. Internal Standards (EPA SW 846 Method 6020)	11/2			
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				And a public of
Were performance evaluation (PE) samples performed?			-	
Were the performance evaluation (PE) samples within the acceptance limits?			_	
X. Sample Result-Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_	,		
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.				
XIII: Field blanks				g and description of the second secon
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

SDG #: 280-2448-1

Sample Specific Element Reference

Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3,6-12		Al, Sb, As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
45		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb(Mg) Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
15-19		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
13,14		Al, Sb. As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
0:20.21		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
12273		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg) Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sì, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ .
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
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		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
ICP-MS		Al, Sb(As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
GFAA		Al Sh As Ba Be Cd Ca Cr Co Cu Fe Ph Mg Mn Hg Ni K Se Ag Na TL V Zn Mo B Si CN

Comments:_	Mercury by CVAA if performed			
· · · · · · · · · · · · · · · · · · ·			 	

Reason Code: bl VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 4, 5 LDC #: 23162E4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg

2nd Reviewer:

Analyte Maximum PB ^a PB ^a (ug/L) Action (ug/L) No Limit Qualifiers Mg 6.82 6.82 Analyte Action Qualifiers Action Qualifiers				
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Mg		alyte Maximum PBª (mg/Kg)		
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		Analyte Maximum PB ^a (mg/Kg)		

Mg			6.82		
Sample Con	ncentration u	nits, unless o	Sample Concentration units, unless otherwise noted: mg/Kg	ed: mg/Kg	Kg Associated Samples: 15-19
Analyte	Maximum PB ^a (ma/Ka)	Maximum Maximum Maximum PB ^a ICB/CCB ^a (ma/Kg) (ua/L)	Maximum ICB/CCB ^a (ua/L)	Action Limit	No Qualifiers
Mg	6.6		4.12		

a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note:

SDG #: See Cover LDC #: 23162F4

VALIDATION FINDINGS WORKSHEET

Page: \(\text{of} \)
Reviewer: \(\text{CR} \)

2nd Reviewer._

Field Blanks

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

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

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

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

Associated Samples: $M_{\alpha} = 4,5,16-19$. $M_{\alpha} = 13-15$ Soil factor applied 100x Sampling date: 4/14/10 Field blank type: (circle

Reason: be

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0,0	>														
7 - 3	ntification														
mples:	Sample Identification									-					
Associated Samples: 1 1															
P-V) AS	_	3													
		21,5;6													
Rinsate / O		No quarisiera													
ank / F		_					_								
eld Bi		Action Level		1.6					<u> </u>						
Field blank type: (circle one) Field Blank / Rinsate / Other:	Blank ID	EB-041, (SDG	0.015	1.6	15										
Field bl	Analyte		8	Mn	Mg										

SDG #: See Cover LDC #: 23162F4

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: Page:__ Reviewer:

> **МЕТНОD**: Trace Metals (EPA SW846 6010B/7000) N N/A

Were field blanks identified in this SDG?

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg

Reason: be

Sampling date: 4/14/10 Soil factor applied 100x Field blank / Rinsate / Other

Ma=4,5,16-19, mn=13-15 Associated Samples:

			r		_		_	 _	 	 			 	=
											,			
Sample Identification														
Sample Io														
	Action Level		18	62										
Blank ID	12-RZC 18-2)		18	62	0.28									
Analyte		8	Mn	Mg	4									

LDC#:	23162E4
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: <u>(</u>	_of!
Reviewer:	_ك
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?
V:\FIELD DUPLICATES\FD_inorganic\23162E4.wpd

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	2	3	RPD	Difference	Limits	(Parent Only)
Arsenic	3.8	4.1	8			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	6	7	RPD	Difference	Limits	(Parent Only)
Arsenic	4.3	4.6	7			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	15	17	RPD	Difference	Limits	(Parent Only)
Arsenic	5.6	5.4	4			
Magnesium	13000	11000	17			

SDG#: 23/82£4 SDG#: SECONOL

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer:_ 2nd Reviewer:

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

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

%R = Found x 100

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 (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
DE PROPERTIES	CO ICP/MS (Initial calibration)	Mn	40.42,3	27	89-	10%)-
8	ICP/MS (Continuing callbation)	AS	5'95	8	0)	101	2-

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

10C# 23K2£ 9

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 spite calculation,
Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

%R = Found x 100

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

RPD = <u>IS-DI</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:

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (ME) KS (tunits)	True / D / SDR (units)	%R/RPD/%D	%R / RPD / %D	Acceptable (Y/N)
ISABS	ICP interference check	Mn	105 yell	Jen (20)	SO	105)-
557	Laboratory control sample	$M_{\mathcal{O}}$	1,05	0,05	- D	8	
77	Matrix spike	Æ	(ssr-sr) 19,2	602	76	26	
12/02	Duplicate	W	21300	00817	7	N	
7	ICP sertal dilution) Or	19 000	1950	9'2	2.2	>

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

LDC #: 23/62 E4 SDG #: <u>Secore</u>)

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

Please W N Y N Y N	N/A		prated range of		e questions are identified as "N/A". I within the linear range of the ICP?
Detect following	ed analy ng equat	te results for			were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	R	ecalculation: 13:	(1251048141000)(5)(100ML) = 650.
RD	=	Raw data concentration			
FV	=	Final volume (ml)		Company	41000 (1092(5) = 12770 18/kg
In. Vol.	=	Initial volume (ml) or weight (G)	10 M. 2	(29100-31	41000 (109) (5/- 127-2 melya
Dil	==	Dilution factor	15:Mg=	<u> </u>	
%S	=	Decimal percent solids	0	(0.035)(106)

	C	0,935)(1.06))	
Sample ID	Analyte	Reported Concentration (M2 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Calculated Concentration	Acceptable (Y/N)
13	AS	803	83	U
	\sim	6500	6500	
		000	0.000	
15	AS	5.6	5.6	7
	Max	13000	13000	3
	- 0	10-00	1.3000	
	4			
			:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-2

Sample Identification

EB-04142010-RIG1-RZC

EB-04142010-RIG2-RZC

EB-04142010-RIG1-RZCMS

EB-04142010-RIG1-RZCMSD

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 Magnesium	0.0348 ug/L 0.550 ug/L 8.34 ug/L	All samples in SDG 280-2448-2
ICB/CCB	Cobalt	0.0191 ug/L	All samples in SDG 280-2448-2

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-04142010-RIG1-RZC	Cobalt Magnesium	0.015 ug/L 15 ug/L	1.0U ug/L 20U ug/L
EB-04142010-RIG2-RZC	Cobalt	0.20 ug/L	1.0U ug/L

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC 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-04142010-RIG1-RZC	4/14/10	Cobalt Manganese Magnesium	0.015 ug/L 1.6 ug/L 15 ug/L	No associated samples in this SDG
EB-04142010-RIG2-RZC	4/14/10	Cobalt Manganese Magnesium Lead	0.20 ug/L 18 ug/L 62 ug/L 0.28 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 280-2448-2	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 280-2448-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-2	EB-04142010-RIG1-RZC EB-04142010-RIG2-RZC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2448-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2448-2	EB-04142010-RIG1-RZC	Cobalt Magnesium	1.0U ug/L 20U ug/L	А	bl
280-2448-2	EB-04142010-RIG2-RZC	Cobalt	1.0U ug/L	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2448-2

No Sample Data Qualified in this SDG

Tronov Northaata Handarean

	Honox Northgate Henderson	5-10-16
LDC #: 23162F4	VALIDATION COMPLETENESS WORKSHEET	Date: 5-P-10
SDG #: 280-2448-2	Stage 2B	Page: <u>(</u> of <u> </u>
Laboratory: Test America		Reviewer: CQ
		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
<u>l.</u>	Technical holding times	A	Sampling dates: 4/14/10
11.	ICP/MS Tune		
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	NOturined
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB=1,2 (no associated samples)

M	ote	

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	Water							
1	EB-04142010-RIG1-RZC	11	85W	21		31		
2	EB-04142010-RIG2-RZC	12		22		32		
3	EB-04142010-RIG1-RZCMS	13		23		33		
4	EB-04142010-RIG1-RZCMSD	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:_			

SDG #: 250-2448-2

Sample Specific Element Reference

Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

		
Sample ID	Matrix	Target Analyte List (TAL)
1,6		Al, Sb As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
Q:34		Al, Sb, As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
ICP-MS		Al, Sb (As) Ba, Be, Cd, Ca, Cr (Ĉo), Cu, Fe (Pb, Mg, Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al Sh As Ba Be Cd Ca Cr Co Cu Fe Ph Mg Mn Hg Ni K Se Ag Na Tl V Zn Mo B Si CN

Comments:	Mercury by CVAA if performed		

LDC #: 23162F4 SDG #: See Cover METHOD: Trace me	_DC #: <u>23162F4</u> SDG #: <u>See Cover</u> METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)	(EPA SW 86	34 Method 60)10B/6020/7	. 0,	ALIDATION PB/ICB/CE	VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA	ORKSHEET SAMPLES d: NA		Reason Code: bl	_	R 2nd R	Page: of ceviewer:	Page: of Reviewer: CAZ 2nd Reviewer: AZ
Sample Cot	Sample Concentration units, unless otherwise noted: ug/	nits, unless c	otherwise not	ted: ug/L		Associated Samples: All	imples: All							
				12.0										
Analyte	Maximum PBª	Maximum Maximum PB ^a ICB/CCB ^a	Maximum ICB/CCB ^a	Action Limit	~	2					<u> </u>			
	(mg/Kg)	(ng/L)	(ng/L)											
ပိ		0.0348	0.0191		0.015/1.0	0.20 / 1.0								
Mn		0.550							-					:
														=

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

15 / 20

8.34

SDG #: See Cover LDC #: 23162F4

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page:∖_ Reviewer:_ 2nd Reviewer:

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

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

Blank units: ug/L Associated sample units: NA

Soil factor applied NA Sampling date: 4/14/10

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

Reason: be

Associated Samples: No Assoicated Samples

							- 277. .			ž	3				
						·									
												-			
on															
Sample Identification															
Sam															
	Action Level														
Blank ID	2	0.20	18	62	0.28										
Blank ID	-	0.015	1.6	15					į						
Analyte		ပိ	Mn	Mg	Pb										

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

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-9

Sample Identification

SA17-6BPC

SA17-8BPC

SA43-3BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No arsenic was found in these blanks.

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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 280-2448-9	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 280-2448-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-9	SA17-6BPC SA17-8BPC SA43-3BPC	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 280-2448-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2448-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2448-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson Τ

	Tronox Northgate Henderson
LDC #: 23162K4	VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2448-9	_ Stage 2B
Laboratory: Test America	

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
l.	Technical holding times	A	Sampling dates: 4/14/10
11,	ICP/MS Tune	<u> </u>	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analy		
VI.	Matrix Spike Analysis	A	ms/D (506*280-2131-9)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Notutilized
XI.	ICP Serial Dilution	A	(280-2131-9)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	NO	FB=FB-040\$72010-RZC, FB-04B2010-RIGH-R
Note:	N = Not provided/applicable R =	= No compound = Rinsate = Field blank	FB=FB-040\$72010-R2C,FB-04B2010-RIGHTR (280-2280-2)

Validated Samples:

1	SA17-6BPC	11	PB5	21	31	
2	SA17-8BPC	12		22	32	
3	SA43-3BPC	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	
	<i>Y</i> .					

∦ Notes:	EB=	EB-04142010-RIGI-RZC (280-2448-2))
		EB-04142010- RIGZ-RZC L	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 15, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic & Manganese

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-1

Sample Identification

SA165-1BPC

SA165-5BPC

SA165-5BPC FD

SSAN6-03-1BPC

SSAN6-03-5BPC

SSAO6-03-1BPC

SSAO6-03-5BPC

SA131-1BPC**

SA131-1BPC FD

SA131-5BPC

SA165-1BPCMS

SA165-1BPCMSD

^{**}Indicates sample underwent Stage 4 review

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.0750 mg/Kg	SA131-1BPC** SA131-1BPC_FD SA131-5BPC

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

Samples FB-04022010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No arsenic or manganese 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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA165-1BPCMS/MSD (SA165-1BPC SA165-5BPC SA165-5BPC_FD SA131-1BPC** SA131-1BPC_FD SA131-5BPC)	Arsenic	133 (75-125)	-	-	J+ (all detects)	А

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 280-2500-1	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

Samples SA165-5BPC and SA165-5BPC_FD and samples SA131-1BPC** and SA131-1BPC_FD were identified as field duplicates. No arsenic or manganese was detected in any of the samples with the following exceptions:

	Concentra	tion (mg/Kg)				A or P	
Compound	SA165-5BPC	SA165-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags		
Arsenic	4.5	4.5	0 (≤50)		-	-	

	Concentral	PPD				
Compound	SA131-1BPC**	SA131-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	6.0	5.9	2 (≤50)	-	-	-
Manganese	3800	4700	21 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Data Qualification Summary - SDG 280-2500-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2500-1	SA165-1BPC SA165-5BPC SA165-5BPC_FD SA131-1BPC** SA131-1BPC_FD SA131-5BPC	Arsenic	J+ (all detects)	А	Matrix spike/Matrix spike duplicates (%R) (m)
280-2500-1	SA165-1BPC SA165-5BPC SA165-5BPC_FD SSAN6-03-1BPC SSAN6-03-5BPC SSAO6-03-1BPC SSAO6-03-5BPC SA131-1BPC** SA131-1BPC_FD SA131-5BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23162M4 Stage 2B / SDG #:_ 280-2500-1 Laboratory: Test America

Reviewer: 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: 4/16/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	BW	ms/p
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Moturilized
XI.	ICP Serial Dilution	19	
XII.	Sample Result Verification	A	Noneviewed for ZB
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3),(8,9)
ΧV	Field Blanks	NO	FB=FB-04072010-RZC & 04072010-RZD

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

7280-2)D = Duplicate
TB = Trip blank

FB= FBOYBZOB-RIGZ-RZI (280-2400-2)

EB = Equipment blank

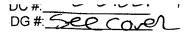
Validated Samples:

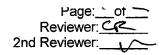
** Level 4

	<u></u>						
1	SA165-1BPC	11	SA165-1BPCMS	21	865	31	
2	SA165-5BPC	12	SA165-1BPCMSD	22		32	
3	SA165-5BPC_FD	13		23		33	
4	SSAN6-03-1BPC	14		24		34	
5	SSAN6-03-5BPC	15		25		35	
6	SSAO6-03-1BPC	16		26		36	
7	SSAO6-03-5BPC	17		27		37	
8	SA131-1BPC **	18		28		38	
9	SA131-1BPC_FD	19		29		39	
10	SA131-5BPC	20		30		40	

Notes:			

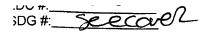
VALIDATION FINDINGS CHECKLIST

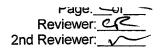




Method: Metals (EPA SW 846 Method 6010/7000/6020)

Wethod: Metals (EPA SW 846 Method 6010/7000/6020)	T			
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				the management of the second
All technical holding times were met.		7		
Cooler temperature criteria was met.				
II Calibration	100			
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				
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 Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV. Matrix spike/Matrix spike dupilicates				and the second of the second of the second
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 Area	Yes	No	NA	Findings/Comments
VI_Furnace/Atomic-Absorptions(IC)				
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?	egyalandi ya si sa			
VII ICR Serial Diletton				Angel May San San Comment
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	~			
Were all percent differences (%Ds) < 10%?	1			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		1		
VIII Internal Staticards (EPA SW 846 Method 6020)				especial description
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?				
X. Sample ResulteVerification :			10.0	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Overalliassessment of datas 2				
Overall assessment of data was found to be acceptable.			-	
XII/CFIeld duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.		-		
XIII: Field planks:				Part of the second seco
Field blanks were identified in this SDG.	/	h 		
Target analytes were detected in the field blanks.				

SDG #: 280-2500-1

Sample Specific Element Reference

Reviewer: CA 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
N-7	5	
· · ·		Al, Sb As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
8-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
0.11 O		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
0611/1C		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sì, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GFAA		Al Sb As Ba Be Cd Ca Cr Co Cu Fe Pb Mg Mn Hg Ni K Se Ag Na Tl V Zn Mo B Si CN

Comments:_	Mercury by CVAA i	f performed	·		
		 		 	

LDC #: 23162M4 SDG #: See Cover METHOD: Trace me Sample Concentration	LDC #: <u>23162M4</u> SDG #: <u>See Cover</u> METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: <u>mg/Kg</u>	(EPA SW 86 nits, unless o	34 Method 60 otherwise no	310B/6020/7 ted: <u>mg/Kç</u>	(00)	VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 8-10	INGS WORK LIFIED SAM or applied: 8-10	SHEET PLES 100x	Re	Reason Code: bl	<u> </u>		Page: of Reviewer: CC	Page: of Reviewer: OR Reviewer: \(\lambda \)
									J. Silveri	SHE STORY		9.36		
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers									
Mn	0.0750													

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

SDG #. SECCONOL LDC #_ 2362M4

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of 2nd Reviewer: Reviewer:

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

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

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

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor Y N/A

of 4 or more, no action was taken.

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

LEVEL IN ONLY: N N/A

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Associated Samples #1-3 8-10	
]][
RPD (1 imits)	
"ABecovery	
MS %Recovery	
Analyte	
Matrix	
CI CIMINAM CI	

Comments:

LDC#:_	23162M4
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

_	((
Page:_	or
Reviewer	: <u>CS</u>
2nd Reviewer:	

METHOD: Metals (EPA Method 6020/7000)

Were field duplicate pairs identified in this SDG?

Which is the field duplicate pairs?

Were target analytes detected in the field duplicate pairs?

Were target analytes detected in the field duplicate pairs?

	Concentrat	ion (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	2	3	RPD	Difference	Limits	(Parent Only)	
Arsenic	4.5	4.5	0				

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	8	9	RPD	Difference	Limits	(Parent Only)
Arsenic	6.0	5.9	2			
Manganese	3800	4700	21			

SDG #: SECOVER

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: \(\begin{align*} \text{of} \\ \text{Reviewer: } \end{align*} 2nd Reviewer: _____

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

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

%R = Found x 100

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 (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	AS	9114	40,0	101	601	<u></u> >
(A:122)	CUC2176) ICP/MS (Continuing calibation)	5	D .%	<i>b.</i> 8	hQ1	/50/	7

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

100 # 23/K2MY SDG #5ERCELON

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Reviewer: 2nd Reviewer:

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

Percent recoveries (%R) for an ICP interference check sample, a laboratory confrol sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 True

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

True = Concentration of each analyte in the source.

A sample and duplicate relative percent cifference (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 = ||-SDR| × 100

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

		•			Recalculated	Renorted	
Sample ID I ype o	Type of Analysis	Element	Found (S/1)	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
ICP interference check		AS	18.6 296	100 15/L	99	B)
LCS Laboratory o	Laboratory centrol sample	PAS	18.8	0.02	bb	hb	
Matrix spike		AS	(ssr-sr) 36,8	523	132	133	
$1/ \mathcal{C} $ Duplicate		WC	0462	2090	Н	Ь	
ICP serial dilution	llution	MN	00872	2650	5.4 3,7	3,7	→

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. 210% On C= Stimil limits = 1 no guals LDC #: 23/6/MY SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	L of \
Reviewer:	Ce
2nd reviewer:_	

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

Please Y N Y N Y N	see qua N/A N/A N/A	The same account topolited all	range of the instruments and wit	
Detector following	ed analy ng equat	te results for	ma	were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	
RD FV In. Vol. Dil %S	= = = = = = = = = = = = = = = = = = = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	(100my/5)(80972 (0,925)(1,14	= 3839 18/kg

	-0, 92)(m9g)				
Analyte	Reported Concontration	Calculated Concentration	Acceptable (Y/N)		
As			Ų		
$-\infty$			Ĵ		
·					
·					
					
		·			
	Analyte	Analyte Ana	Reported Calculated Concentration (MS/K) As 6.0 6.0 3800 3800		

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 16, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2541-1

Sample Identification

SA107-2BPC SA107-5BPC

SA107-2BPCMS

SA107-2BPCMSD

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-04132010-RIG2-RZE (from SDG 280-2400-2) 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 280-2541-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2541-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2541-1	SA107-2BPC SA107-5BPC	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 280-2541-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2541-1

No Sample Data Qualified in this SDG

Q LDC #: 23162M4

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

	Date:	5-19-10
	Page:_	
	Reviewer:	CC
2nd	Reviewer:	1

SDG #:_ 280-2541-1 Laboratory: Test America

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: 4-16-10
11.	ICP/MS Tune	A	
Ш.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	7	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\sim	No+ utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\mathcal{N}	
XV	Field Blanks	1/0	FB = FB · OH 132010 - RIGZ - RZE Span 280 2400-2

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	all soil				
1	SA107-2BPC	11	905	21	31
2	SA107-5BPC	12		22	32
3	SA107-2BPCMS	13		23	33
4	SA107-2BPCMSD	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:			
T-01-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1			

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 7, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-8

Sample Identification

SA137-7BPC

SA130-9BPC

SA84-7BPC

SA84-9BPC

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 1030F.
- 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 FB-04072010-RZC (from SDG 280-2280-2) and FB04062010-RZB (from SDG 280-2131-1) 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 280-2216-8	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 280-2216-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-8	SA137-7BPC SA130-9BPC SA84-7BPC SA84-9BPC	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 280-2216-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2216-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 5-19-	10
Page: <u>1</u> of <u>1</u>	
Reviewer: CC	
2nd Reviewer: 1	/

SDG #: 280-2216-8 Laboratory: Test America

23162W4

LDC #:

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
l	Technical holding times	A	Sampling dates: 4/7/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	IA_	
V.	ICP Interference Check Sample (ICS) Analysis	7	
VI.	Matrix Spike Analysis	A	MS/D (SDG & Z80-2131-9)
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	17	LCS
IX.	Internal Standard (ICP-MS)	A	,
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	NO+Utilized (SOC * 280-2131-9)
XI.	ICP Serial Dilution	A	(500 x 280-2131-9)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	NO	PB=FB-04072010-RZC, FB04062010-RZB (280-2280-2) (280-2131-1)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(790.7780-Z)ed D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	SA137-7BPC	11	PBS	21	31
2	SA130-9BPC	12	-	22	32
3	SA84-7BPC	13		23	33
4	SA84-9BPC	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:	 	 	

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23162

Perchlorate



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-1

Sample Identification

SSAJ3-03-1BPC**

SSAJ3-03-5BPC**

SSAJ3-03-1BPC FD

SSAJ3-03-1BPCMS

SSAJ3-03-1BPCMSD

SSAJ3-03-1BPCDUP

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 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-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RIG3-RZD (from SDG 280-2400-2) were identified as field blanks. No perchlorate was found in these blanks.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses 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 280-2400-1	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 SSAJ3-03-1BPC** and SSAJ3-03-1BPC_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentrati	ion (mg/Kg)	DDD	D'''			
Analyte	SSAJ3-03-1BPC**	SSAJ3-03-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Perchlorate	0.076	0.065	16 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2400-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-1	SSAJ3-03-1BPC** SSAJ3-03-5BPC** SSAJ3-03-1BPC_FD	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2400-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2400-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23162B6	VALIDATION COMPLETENESS WORKSHEET	Date: 5-19-10
SDG #: 280-2400-1	_ Stage 2B ∬Y	Page: _of _
Laboratory: Test America		Reviewer: _ Ca
		2nd Reviewer:
METHOD: (Analyte) Perch	lorate (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: 4/13/10
IIa.	Initial calibration	P	
ıdll.	Calibration verification	\chi_	
111.	Blanks	R	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCSID
VII.	Sample result verification	A	Not reviewed for Stage ZB
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(1,3)
x	Field blanks	NO	FB=FB-04072010-RZD (280-1216-Z)
Note:	A = Acceptable N = Not provided/applicable	ND = No compounds R = Rinsate	FB = FB - 04072010 - RZD (280-216-Z) EB = FB-04132010- RIG3-RZD (280-2400-Z D = Duplicate TB = Trip blank

N = Not provided/applicable

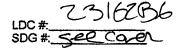
SW = See worksheet

R = Rinsate FB = Field blank TB = Trip blank EB = Equipment blank

Validated Samples:

,	50\					
1	SSAJ3-03-1BPC	11	865	21	31	
2	SSAJ3-03-5BPC**	12		22	32	
3	SSAJ3-03-1BPC_FD	13		23	33	
4	SSAJ3-03-1BPCMS	14		24	34	
5	SSAJ3-03-1BPCMSD	15		25	35	
6	SSAJ3-03-1BPCDUP	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 ___ Reviewer: ______ 2nd Reviewer: ______

Method: Inorganics (EPA Method Seccord)

Method: Inorganics (EPA Method Selection)				
Validation Area	Yes	No	NA	Findings/Comments
Effectived heldingenies (e.g., c., c., c., c., c., c., c., c., c., c				
All technical holding times were met.				
Cooler temperature criteria was met.				
FLC-allocation Comments and Com		Set 18.		production of the second
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?			<u> </u>	
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)	<u> </u>		/	
Were balance checks performed as required? (Level IV only)		and Profit and the	/	
Ur Sainte See Called S				
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.		/		
De pratros pice Marios sokiemunicares apoconolicaes es e				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? if no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		~		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.				
Vitaboeide Baro Barolles Communication (Communication Communication Comm				
Was an LCS anayized for this SDG?	4]	
Was an LCS analyzed per extraction batch?	4			
Were the LCS percent recoverles (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			N. 2004
VI_Regitinal Audity Assurator and Quality Canapi - VI so and a second				
Were performance evaluation (PE) samples performed?	\bot	(A	
Were the performance evaluation (PF) samples within the accentance limits?			_	

LDC #: 23/6236 SDG #: <u>See cover</u>

VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: CC 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/	<u>ر</u>		
Were detection limits < RL?		_		
YIT! Civerall essessiperal of date.				en all and a second and a second
Overall assessment of data was found to be acceptable.	/			
X Field duplicates				
Field duplicate pairs were identified in this SDG.		,		
Target analytes were detected in the field duplicates.				
X. Freid blenks				
Field blanks were identified in this SDG.	7			
Target analytes were detected in the field blanks.	/			

LDC#: 23162B6 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

4	٦ ١
Page:_	`of
Reviewer:	02
2nd Reviewer:	

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	on (mg/Kg)				Qualification
Analyte	1	3	RPD (≤50)	Difference	Limits	(Parent only)
Perchlorate	0.076	0.065	16		,,,	

V:\FIELD DUPLICATES\FD_inorganic\23162B6.wpd

SDG#: 25/62/96 SDG#: SPC/COVO/

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: Of Zand Reviewer:

Method: Inorganics, Method

314,0

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula: The correlation coefficient (r) for the calibration of $\bigcirc\bigcirc\bigcirc$ was recalculated.Calibration date: $\bigcirc/\bigcirc/\bigcirc$

%R = <u>Found X 100</u>

Where, Foun

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/I)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.00245			
		s2	2	0.00841	0.998504	0.998762	0
	<u>(</u>	83	5	0.01661)-
	3	84	10	0.03291			_
	4	s5	20	0.06345			,
		s6	40	0.14097			
Calibration verification		ICV	92	18.889	7		
Calibration verification		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	30	18.791	76		
Calibration verification		730	()	205'6	95		

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.

23/8288 SECONOL LDC #:_

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: Reviewer: 2nd Reviewer:

METHOD: Inorganics, Method Selcover

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

%R = Found x 100

Found =

True ==

concentration of each analyte measured in the analysis of the sample. For the matrix splke calculation,

Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source.

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

RPD = <u>|S-D|</u> x 100 Where, (S+D)/2

Original sample concentration

Duplicate sample concentration S II

		-			Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	0dH / 8%	%R / RPD	Acceptable (Y/N)
(Laboratory control sample						
()		010rl	0,6950	0,6950 0,0996	J.	66)-
_	Matrix spike sample		(SSR-SR)				-
7			201.0	60,109	76.	166	
)	Duplicate sample						
9		\rightarrow	0,076	0.0175	7	7	

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

LDC #:	23/62136
LDC #:	
SDG #:	seeroel

LDC #: 23/6285 SDG #: <u>see co</u> ler	VALIDATION FINDINGS WO Sample Calculation Verif		Page Reviewe 2nd reviewe	r: CE
METHOD: Inorganics, Method _	Secoul			
Y N N/A Have results bee	or all questions answered "N". Not appear reported and calculated correctly? In the calibrated range of the instrument limits below the CRQL?		re identified as "	N/A".
Compound (analyte) results for _ recalculated and verified using the	CIO4	repo	rted with a positiv	e detect were
concentration = ea - Offset) Prep Factor (5) Slope % Solid		74.008) 0034 .000		= 1.2
		Reported Concentration	©,93 Calculated Concentration	Acceptable

			<u></u>	<u> </u>	
#	Sample ID	Analyte	Reported Concentration (Me 40	Calculated Concentration Wg/Kg7	Acceptable (Y/N)
	3	C 104	6000	1,7	Y
			1,1		
					·
-					
ļ					
-					
			·		
-					
 					
-					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-1

Sample Identification

SSAN6-01-1BPC**

SSAN6-01-5BPC**

SSAN6-01-5BPC FD

SSAO6-01-1BPC**

SSAO6-01-5BPC**

SSAO6-01-1BPC FD

SSAO6-01-5BPCMS

SSAO6-01-5BPCMSD

SSAO6-01-5BPCDUP

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 9 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 EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No perchlorate was found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG2-RZC	4/14/10	Perchlorate	2.3 ug/L	All samples in SDG 280-2448-1

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

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) analyses 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 280-2448-1	All analytes reported below the PQL.	J (all detects)	A

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples SSAN6-01-5BPC** and SSAN6-01-5BPC_FD and samples SSAO6-01-1BPC** and SSAO6-01-1BPC_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentration (mg/Kg) SSAN6-01-5BPC** SSAN6-01-5BPC_FD (Limits) Difference (Limits)		D'''				
Analyte	SSAN6-01-5BPC**	SSAN6-01-5BPC_FD			Flags	A or P	
Perchlorate	38	33	14 (≤50)	_	-	-	

	Concentrati	on (mg/Kg)	555	D:#		A or P	
Analyte	SSAO6-01-1BPC**	SSAO6-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags		
Perchlorate	67	71	6 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2448-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-1	SSAN6-01-1BPC** SSAN6-01-5BPC_FD SSAO6-01-1BPC** SSAO6-01-1BPC** SSAO6-01-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2448-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ET

DC #: <u>23162E6</u>	VALIDATION COMPLETENES	S WORKSHE
SDG #: 280-2448-1	_ Stage 2B	14
_aboratory:_Test America		1

Date:	2-14-11
Page:_	<u></u> of
Reviewer:	CR
2nd Reviewer:	

METHOD: (Analyte)	Perchlorate (EPA Method 314.0)
· • /	

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/14/10
IIa.	Initial calibration	9	,
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/p
V	Duplicates	A	OP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	Not reviewed for Stage 2B
VIII.	Overall assessment of data	A	
IX.	Field duplicates	5W	(2,3),(4,6)
L _X	Field blanks	SWA	FB = FB -04072010 - RZC (250-2250-2) s detected D = Duplicate #see below
Note:	A = Acceptable	ND = No compounds	s detected D = Duplicate #see beby

N = Not provided/applicable

SW = See worksheet

R = Rinsate

* Level4

FB = Field blank

D = Duplicate

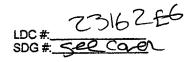
TB = Trip blank

EB = Equipment blank

Validated Samples: 50 \

1	SSAN6-01-1BPC **	11	8B5	21	31
2	SSAN6-01-5BPC	12		22	32
3	SSAN6-01-5BPC_FD	13		23	33
4	SSAO6-01-1BPC **	14		24	34
5	SSAO6-01-5BPC	15		25	35
6	SSAO6-01-1BPC_FD	16		26	36
7	SSAO6-01-5BPCMS	17		27	37
8	SSAO6-01-5BPCMSD	18		28	38
9	SSAO6-01-5BPCDUP	19		29	39
10		20		30	40

Notes: *	EB= EB-0/47010-RIG1-RZC	(280-2448-2)
	EB- \$142010 - RIGZ-RZC	The state of the s
	04	



VALIDATION FINDINGS CHECKLIST

Page: ___of __ Reviewer: ____ 2nd Reviewer: ____

Method: Inorganics (EPA Method Seecole)

Method:Inorganics (EPA Method Section ()				
Validation Area	Yes	No	NA	Findings/Comments
Effectived helping times as a second				
All technical holding times were met.	<u> </u>			
Cooler temperature criteria was met.				
place to central the second				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	1	2		
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)	TO COMPANY OF BRIDE	an rain and a		
III SANSTRUK SANSTRUK MENENGAN				
Was a method blank associated with every sample in this SDG?	1			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		√		
DE METRE, pROMBUS CONCIDENTES DE CON				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	_			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	·			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.				
V Convenience Company of the Convenience C				
Was an LCS anaytzed for this SDG?				
Was an LCS analyzed per extraction batch?	//			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				ANGEORE A SHARE
VE Regional Quality Assucator and Quality Control 168 200 200 200 200 200 200 200 200 200 20				
ı ·				/
Were performance evaluation (PE) samples performed?				

LDC #: 13/6286 SDG #: <u>See carer</u>

VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: CC 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII Semple Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/	<u> </u>		
VIII: Overall assessment of date:				
Overall assessment of data was found to be acceptable.				
(X. Field duplicates				
Field duplicate pairs were identified in this SDG.				•
Target analytes were detected in the field duplicates.				
X. Freid blanks				
Field blanks were identified in this SDG.	17			
Target analytes were detected in the field blanks.	1			

SDG # See Cover LDC #: 23162E6

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer._ 2nd Reviewer:

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

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg Y N N/A

Sampling date: 4/14/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other.

EB

Associated Samples: + Reason Code: be

-				 	 	
	ication					
	Sample Identification					
		\ <u>\</u>				
		N090N				
	Action Limit		0.23			
	Blank ID	EB-04142010-RIG2-RZC (SDG#: 280-2448-2)	2.3			
	Analyte		CIO4			

LDC#: 23162E6 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

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

Inorganics, Method: See Cover

YN NA YN NA

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

	Concentrati	on (mg/Kg)			<u>-</u>	0
Analyte	2	3	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	38	33	14			

V:\FIELD DUPLICATES\FD_inorganic\23162E6.wpd

	Concentrati	on (mg/Kg)				Overlift and an
Analyte	4	6	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	67	71	6			

SDG #: SPQ COLON LDC#: 73162E6

Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

Page: of Reviewer: 2nd Reviewer:_

Method: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of $\frac{CQ_{\rm q}}{CQ_{\rm q}}$ was recalculated.Calibration date: $\frac{\gamma/2J/0}{C}$

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

%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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.00245			
		s2	2	0.00841	0.998504	0.998762	
	-	s3	5	0.01661			<i></i>
	000	84	10	0.03291			
		S5	20	0.06345	-		
		9s	40	0.14097			
Calibration verification		ICN	20	18.869	dd		
Calibration verification			30	30,394	101		-
Calibration verification							

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

23/828 SECONOL LDC #:_

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Reviewer:

METHOD: Inorganics, Method Seccover

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 =

ĭrue =

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.

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

RPD = $\frac{|S-D|}{(S+D)/2}$ x 100 Where,

Duplicate sample concentration Original sample concentration

S) ` II

		-			Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (writes) (46)	True / D (units)(5)	%R / RPD	%R/RPD	Acceptable (Y/N)
	Laboratory control sample					(
5		C104	6.0939	6000	<u></u>	25	<u> </u>
. 1	Matrix spike sample		(SSR-SR)				
			h.21	9,01	7 11	<u></u>	
Ć	Duplicate sample		, 0	(
_)	90	33.7		7	\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.

LDC #: 23/6284	2
LDC #: 0 7/0	
SDG #: See COVER	

VALIDATION FINDINGS WORKSHEET

Page: of Reviewer: C2

SDG #: <u>5ee</u> (200	Sample Calculation ve	micauon	2nd reviewer:
METHOD: inorga	anics, Method Sec	2 call		
YN N/A H	lave results been reported are results within the cali	estions answered "N". Not a ed and calculated correctly brated range of the instrum	?	dentified as "N/A".
Compound (anal	Are all detection limits be yte) results for	Cloy	reported	with a positive detect were

Concentration =

Area-Offset (prep Factor)(DF)

Slope

Concentration =

Recalculation:

(0.06585+0.008)(10

1000

0.0034

=10001

#	Sample ID	Analyte	Reported Concentration (MS- K)	Calculated Concentration (\(\sqrt{\q} \)	Acceptable (Y/N)
		ClOu	1000	1000	9
	, and the second se				
					·
			·		
					
<u> </u>					
 					
<u> </u>					
<u> </u>					
-					
-					

Note:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil/Water

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-2

Sample Identification

SA106-4BPC

SA106-6BPC

SA106-8BPC

EB-04142010-RIG1-RZC

EB-04142010-RIG2-RZC

EB-04142010-RIG1-RZCMS

EB-04142010-RIG1-RZCMSD

EB-04142010-RIG1-RZCDUP

Introduction

This data review covers 3 soil samples and 5 water 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.

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. 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 EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC were identified as equipment blanks. No perchlorate was found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG2-RZC	4/14/10	Perchlorate	2.3 ug/L	All soil samples in SDG 280-2448-2

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

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) analyses 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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-2	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2448-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-2	SA106-4BPC SA106-6BPC SA106-8BPC EB-04142010-RIG1-RZC EB-04142010-RIG2-RZC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2448-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2448-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2448-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23162F6	VALIDATION COMPLETENESS WORKSHEET	Date: 5
SDG #: 280-2448-2	_ Stage 2B	Page: <u>د</u> o
Laboratory: Test America		Reviewer: 🕳
		2nd Reviewer: 🕦

SDG #: 280-2448-2 _aboratory: Test America			S	tage 2B				Page:_∟o Reviewer:_ <u>←</u> 2nd Reviewer:_ <u>↓</u>	
VIETH	HOD: (Analyte) Perchlo	orate (I	EPA Meth	od 314.0)					
	amples listed below were tion findings worksheets.	review	ved for eac	ch of the fo	ollowing va	alidatio	on areas. Validatio	on find	dings are noted in attac
	Validation	Area					Comm	ents	
l.	Technical holding times			A	Sampling d	ates:	4/14/10		
lla.	Initial calibration			R					
lib.	Calibration verification			8					
111.	Blanks			8					
IV	Matrix Spike/Matrix Spike Du	uplicates		A	ms/s)	CS06* 250	-24	18-1)
V	Duplicates				Dip		1	_	·
VI.	Laboratory control samples			A	LCS	D			
VII.	Sample result verification			N	·				
VIII.	Overall assessment of data			A					
IX.	Field duplicates			N					
X_	Field blanks			SW	FB-	- 4	,5, FB= F	Bou	1072010-RZC 280-2280-2)
Vote: Validat	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples:		R = Rin	o compounds sate eld blank	s detected		D = Duplicate TB = Trip blank EB = Equipment blan		(280-2280-2)
1	SA106-4BPC \$	11			21	PB	5	31	
2	SA106-6BPC	12			22	PF	3 ✓	32	
3	SA106-8BPC	13			23	`		33	
4	EB-04142010-RIG1-RZC	14		~	24			34	
5	EB-04142010-RIG2-RZC	15	· · · · · · · · · · · · · · · · · · ·		25			35	
6	EB-04142010-RIG1-RZCMS	16			26			36	
7	EB-04142010-RIG1-RZCMSD	17	· · · · · · · · · · · · · · · · · · ·		27			37	
8	EB-04142010-RIG1-RZCDUP	18			28	ļ		38	
9		19			29			39	
10		20			30			40	
Notes	5:					· · · · · · · · · · · · · · · · · · ·			

SDG #: See Cover LDC #: 23162F6

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: C Page: 2nd Reviewer.

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? N N/A

(EB) Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/14/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Reason Code: be

_						 _	
				-			
Associated Samples: A\\ So,\	Sample Identification						
Associated Sar							
- (EB)	1						
Soil factor applied 10x eld Blank / Rinsate / Other	Action Limit		0.23				
O Soil facto one) Field Blank	Blank ID	5	2.3				
Sampling date: 4/14/10 Soil 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 14, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-9

Sample Identification

SSAN6-01-3BPC

Introduction

This data review covers one soil sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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. 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 EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No perchlorate was found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG2-RZC	4/14/10	Perchlorate	2.3 ug/L	All samples in SDG 280-2448-9

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

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) analyses 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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-9	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2448-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-9	SSAN6-01-3BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2448-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2448-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2448-9

No Sample Data Qualified in this SDG

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fronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
_ Stage 2B
<u>-</u>

	Date:	5-19-16	
	Page:_	<u>of</u>	
	Reviewer:	CR	
2nd	Reviewer:	~~	

Laboi	atory: Test America	_			3				Reviewer: 2nd Reviewer:
METI	HOD: (Analyte) Perchl	orate	(EPA Meth	od 314.0)					
	amples listed below were ation findings worksheets.		ewed for each	ch of the f	following	j va	lidation areas. Valida	tion find	dings are noted in attached
	Validation	Area					Com	ments	
1.	Technical holding times			A	Samplir	ng da	ntes: 4/14/10		
lla.	Initial calibration			A					
llb.	Calibration verification		· · · · · · · · · · · · · · · · · · ·	8					
111.	Blanks			X		_			
IV	Matrix Spike/Matrix Spike D	uplicat	es .	A	ms	10	(SOG# 280	-2449	8-1)
V	Duplicates			A	Dy	2	, <u> </u>		
VI.	Laboratory control samples			A	LC,	<u>S</u> _			
VII.	Sample result verification			N					
VIII.	Overall assessment of data			A					
IX.	Field duplicates			N	1				
Lx_	Field blanks		<u> 5</u> v	V 18ED	FB	=	1=B-04072010	1- Ba	ZC (5064 250-2280) seebllow
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	;	R = Rin	o compound sate eld blank	ds detecte	ed:	D = Duplicate TB = Trip blank EB = Equipment b		seebllow
Validat	red Samples:								
1	SSAN6-01-3BPC	11	865		2	21		31	
2		12			2	22		32	
3		13			2	23		33	
4		14			2	24		34	
5		15			2	25		35	
6		16			2	26	***************************************	36	
7		17			2	7		37	

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:_	*	EB=	EB-0142010-K161-RZC	(280-2448-2)
			EB=0142010-RIGZ-RZC	

SDG #: See Cover LDC #: 23162K6

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer:___ 2nd Reviewer.

Were target analytes detected in the field blanks? Were field blanks identified in this SDG? METHOD: Inorganics, EPA Method See Cover

YN N/A

Blank units: ug/L Associated sample units: mg/Kg Y/N N/A

Sampling date: 4/14/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples: Reason Code: be

tification					
Sample Identification					
Action Limit		0.23			
Blank ID	EB-04142010-RIG2-RZC (SDG#: 280-2448-2)	2.3			
Analyte		CIO4			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 15, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2500-1

Sample Identification

SA72-4BPC

SA72-6BPC

SA72-8BPC

SSAM5-01-2BPC

SSAM5-01-4BPC

SSAM5-01-6BPC

SSAM5-01-8BPC

SSAM5-01-10BPC

SSAO6-03-1BPC

SSAO6-03-5BPC

SA72-4BPCMS

SA72-4BPCMSD

SA72-4BPCDUP

Introduction

This data review covers 13 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.

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. 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-04072010-RZC (from SDG 280-2280-2) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses 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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2500-1	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2500-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2500-1	SA72-4BPC SA72-6BPC SA72-8BPC SSAM5-01-2BPC SSAM5-01-4BPC SSAM5-01-6BPC SSAM5-01-8BPC SSAM5-01-10BPC SSAO6-03-1BPC SSAO6-03-5BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2500-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23162M6 SDG #: 280-2500-1 Laboratory: Test America	VALIDATION COMPLETENESS WORKSHEET Stage 2B	Date: 5-19-1(Page: 1of 1 Reviewer: 2nd Reviewer:
METHOD: (Analyte) Perch	lorate (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: 4/15/10
lla.	Initial calibration	A	
IIb.	Calibration verification	A	
HL.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	msp
V	Duplicates	A	DP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
lX.	Field duplicates	\sim	
X	Field blanks	IND	FB=FB-04072010-RZC (280-2280-Z) = FB-04072010-RZD (280-2216-Z) selected D=Dunlicate
Note:	•	ND = No compounds R = Rinsate	7 FB-04-072010-R2D (280-2216-2) s detected D = Duplicate TB = Trip blank FB = Favirment blank

SW = See worksheet

FB = Field blank

EB = Equipment blank

Validated Samples:

	<u></u>				
1	SA72-4BPC	11	SA72-4BPCMS	21 865	31
2	SA72-6BPC	12	SA72-4BPCMSD	22	32
3	SA72-8BPC	13	SA72-4BPCDUP	23	33
4	SSAM5-01-2BPC	14		24	34
5	SSAM5-01-4BPC	15		25	35
6	SSAM5-01-6BPC	16		26	36
7	SSAM5-01-8BPC	17		27	37
8	SSAM5-01-10BPC	18		28	38
9	SSAO6-03-1BPC	19		29	39
10	SSAO6-03-5BPC	20		30	40

Notes:			
			-