

LABORATORY DATA CONSULTANTS, INC.

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Northgate Environmental Management, Inc.

June 2, 2010

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

SUBJECT: Tronox LLC Facility, 2010 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 # 23126:

SDG #	<u>Fraction</u>
280-2131-1, 280-2131-5, 280-2131-6, 280-2131-9, 280-2216-1, 280-2216-2, 280-2216-4, 280-2216-5, 280-2216-7, 280-2216-7, 280-2270-1, 280-2270-2, 280-2280-1, 280-2280-5, 280-2280-6, 280-2352-6, 280-2301-3, 280-2352-1, 280-2352-1, 280-2352-1	Semivolatiles, Chlorinated Pesticides, Metals, Perchlorate

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

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



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

Sincerely,

Erlinda T. Rauto

Operations Manager/Senior Chemist

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Tronox PCS Data Validation Reports LDC# 23126

Semivolatiles



Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 6, 2010

LDC Report Date: May 27, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-1

Sample Identification

RSAQ3-3BPC FD

SA169-6BPC FD

RSAQ3-3BPC

RSAQ3-5BPC

SA169-3BPC

SA169-5BPC

SA169-6BPC

RSAK7-3BPC

RSAK7-5BPC

SSAJ8-01-1BPC

SSAJ8-01-5BPC

RSAJ8-5BPC

RSAJ8-3BPC FD

RSAJ8-3BPC

RSAJ8-3BPCMS

RSAJ8-3BPCMSD

Introduction

This data review covers 16 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
MB280-10308/1-A	4/8/10	Bis(2-ethylhexyl)phthalate	81.9 ug/Kg	All samples in SDG 280-2131-1

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAQ3-3BPC_FD	Bis(2-ethylhexyl)phthalate	93 ug/Kg	93U ug/Kg
SA169-6BPC_FD (10X)	Bis(2-ethylhexyl)phthalate	1200 ug/Kg	1200U ug/Kg
RSAQ3-3BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
RSAQ3-5BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
SA169-3BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
SA169-6BPC (10X)	Bis(2-ethylhexyl)phthalate	1400 ug/Kg	1400U ug/Kg
RSAK7-3BPC	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg
RSAK7-5BPC	Bis (2-ethylhexyl) phthalate	110 ug/Kg	110U ug/Kg
SSAJ8-01-1BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SSAJ8-01-5BPC	Bis (2-ethylhexyl) phthalate	110 ug/Kg	110U ug/Kg
RSAJ8-5BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
RSAJ8-3BPC_FD	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
RSAJ8-3BPC	Bis(2-ethylhexyl)phthalate	130 ug/Kg	130U ug/Kg

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB04062010-RZB (from SDG 280-2131-2) 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	RSAK7-3BPC RSAK7-5BPC SSAJ8-01-1BPC SSAJ8-01-5BPC RSAJ8-5BPC RSAJ8-3BPC_FD RSAJ8-3BPC
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	RSAQ3-3BPC_FD SA169-6BPC_FD RSAQ3-3BPC RSAQ3-5BPC SA169-3BPC SA169-5BPC SA169-6BPC

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 recoveries (%R) were not within QC limits for some compounds, the MS 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 280-2131-1	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples RSAQ3-3BPC_FD and RSAQ3-3BPC, samples SA169-6BPC_FD and SA169-6BPC, samples RSAJ8-3BPC_FD and RSAJ8-3BPC, samples RSAK7-3BPC and RSAK7-3BPC_FD (from SDG 280-2131-2), and samples SSAJ8-01-1BPC and SSAJ8-01-1BPC_FD (from SDG 280-2131-2) were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentrati	on (ug/Kg)	200	D.#			
Compound	RSAQ3-3BPC_FD	RSAQ3-3BPC	RPD (Limits)	Difference (Limits)	Flags	A or P	
Bis(2-ethylhexyl)phthalate	93	110	-	17 (≤360)	-		

	Concentrati	on (ug/Kg)	200			
Compound	SA169-6BPC_FD	SA169-6BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(a)anthracene	3500U	340	_	3160 (≤3500)	-	-
Benzo(a)pyrene	3500U	280	-	3220 (≤3500)	-	-
Benzo(b)fluoranthene	350	700	-	350 (≤3500)	-	-

	Concentrati	ion (ug/Kg)				
Compound	SA169-6BPC_FD	SA169-6BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(g,h,i)perylene	190	320	-	130 (≤3500)	-	-
bis(2-ethylhexyl)phthalate	1200	1400	-	200 (≤3500)	-	-
Chrysene	410	620	-	210 (≤3500)	-	-
Fluoranthene	3500U	580	-	2920 (≤3500)	-	-
Phenanthrene	220	330	_	110 (≤3500)	-	_
Pyrene	320	610	-	290 (≤3500)	-	-

	Concentrat	ion (ug/Kg)				
Compound	RSAJ8-3BPC_FD	RSAJ8-3BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(a)anthracene	23	350U	-	327 (≤360)	-	-
Benzo(a)pyrene	23	350U	-	327 (≤360)	-	-
Benzo(b)fluoranthene	74	64	-	10 (≤360)	-	-
Benzo(g,h,i)perylene	22	350U	-	328 (≤360)	-	-
bis(2-ethylhexyl)phthalate	120	130	-	10 (≤360)	-	-
Chrysene	58	59	-	1 (≤360)	-	-
Fluoranthene	46	44	-	2 (≤360)	-	-
Octachlorostyrene	5600	5700	-	100 (≤360)	-	-
Pyrene	37	39		2 (≤360)	-	-
Hexachlorobenzene	16000	18000	<u>-</u>	2000 (≤3600)	•	-

	Concentrat	ion (ug/Kg)	200	D		
Compound	RSAK7-3BPC	RSAK7-3BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(b)fluoranthene	350U	30	-	320 (≤360)	-	_
Bis(2-ethylhexyl)phthalate	140	140	-	0 (≤360)	-	-
Chrysene	46	54	-	8 (≤360)	-	•
Fluoranthene	46	50	-	4 (≤360)	-	-
Octachlorostyrene	5100	5900	8 (≤50)	-	-	-
Phenanthrene	23	31	-	8 (≤360)	-	-
Pyrene	28	32	-	4 (≤360)	-	-
Hexachlorobenzene	27000	34000	23 (≤50)	•	•	•

	Concentra	tion (ug/Kg)	RPD	Difference	·	
Compound	SSAJ8-01-1BPC	SSAJ8-01-1BPC_FD	(Limits)	(Limits)	Flags	A or P
Benzo(a)anthracene	45	35	•	10 (≤360)	-	-
Benzo(b)fluoranthene	110	92	-	18 (≤360)	-	-
Benzo(g,h,i)perylene	19	17	•	2 (≤360)	-	-
Bis(2-ethylhexyl)phthalate	110	120	-	10 (≤360)	-	-
Chrysene	190	170	-	20 (≤360)	-	-
Fluoranthene	220	180	-	40 (≤360)	-	-
Phenanthrene	57	44	-	13 (≤360)	-	-
Pyrene	150	120	-	30 (≤360)	-	-
Octachlorostyrene	21000	18000	26 (≤50)	-	-	-
Hexachlorobenzene	74000	66000	22 (≤50)	-	-	<u>-</u>

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2131-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-1	RSAQ3-3BPC_FD SA169-6BPC_FD RSAQ3-3BPC RSAQ3-3BPC SA169-3BPC SA169-5BPC SA169-6BPC RSAK7-3BPC RSAK7-5BPC SSAJ8-01-1BPC SSAJ8-01-5BPC RSAJ8-5BPC RSAJ8-3BPC_FD RSAJ8-3BPC_FD	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 280-2131-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2131-1	RSAQ3-3BPC_FD	Bis(2-ethylhexyl)phthalate	93U ug/Kg	А	ld
280-2131-1	SA169-6BPC_FD (10X)	Bis(2-ethylhexyl)phthalate	1200U ug/Kg	Α	bl
280-2131-1	RSAQ3-3BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	bl
280-2131-1	RSAQ3-5BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	Α	bl
280-2131-1	SA169-3BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	А	bl
280-2131-1	SA169-6BPC (10X)	Bis(2-ethylhexyl)phthalate	1400U ug/Kg	А	bl
280-2131-1	RSAK7-3BPC	Bis(2-ethylhexyl)phthalate	140U ug/Kg	А	bl
280-2131-1	RSAK7-5BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	bi
280-2131-1	SSAJ8-01-1BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	ld
280-2131-1	SSAJ8-01-5BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	А	bl
280-2131-1	RSAJ8-5BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	А	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2131-1	RSAJ8-3BPC_FD	Bis(2-ethylhexyl)phthalate	120U ug/Kg	А	bl
280-2131-1	RSAJ8-3BPC	Bis(2-ethylhexyl)phthalate	130U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2131-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23126A2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2131-1	_ Stage 2B
Laboratory: Test America	.

Page: 1 of 1 Reviewer: ML 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
	Technical holding times	A	Sampling dates: 4 /6 /10
	GC/MS Instrument performance check	A	
	Initial calibration	A	? RSD IY
	Continuing calibration/ICV	A	ca/100 = 253
	Blanks	SN	
	Surrogate spikes	SN	
	Matrix spike/Matrix spike duplicates	SW)	
l.	Laboratory control samples	A	ucs
	Regional Quality Assurance and Quality Control	N	
	Internal standards	A	
	Target compound identification	N	
	Compound quantitation/CRQLs	N	
l.	Tentatively identified compounds (TICs)	N	
<i>'</i> .	System performance	N	
	Overall assessment of data	Д	
١.	Field duplicates	SW	$D_1 = 1.3$ $D_2 = 2.7$ $D_3 = 13.14$ $D_5 = 10 + 10.00$ $D_4 = 10.00$ $D_5 = 10.00$ $D_5 = 10.00$ $D_6 = 10.00$ $D_7 = 10.00$
l.	Field blanks	SW	$D_1 = 1.3 \qquad D_2 = 3.7 \qquad D_3 = 13.14 \qquad D_5 = 10 + SSAJ8-61-$ $FB = FB-04072010- R2D (280-2216-2) \qquad (both form form form form form form form form$

A = Acceptable ND = No compounds detected D = Duplicate N = Not provided/applicable R = Rinsate

TB = Trip blank FB = Field blank EB = Equipment blank

Validated Samples:

SW = See worksheet

Note:

	5011				
1	RSAQ3-3BPC_FD ⊅,	11	SSAJ8-01-5BPC	21	31
2	SA169-6BPC_FD Dy	12	RSAJ8-5BPC	22	32
3	RSAQ3-3BPC D,	13	RSAJ8-3BPC_FD \$\mu_3\$	23	33
4	RSAQ3-5BPC	14	RSAJ8-3BPC D3	24	34
5	SA169-3BPC	15	RSAJ8-3BPCMS	25	35
6	SA169-5BPC	16	RSAJ8-3BPCMSD	26	36
7	SA169-6BPC 𝔭 ✓	17		27	37
8	RSAK7-3BPC D4	18		28	38
9	RSAK7-5BPC	19		29	39
10	SSAJ8-1BPC D5	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-Chloropheno!	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene⁴	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-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
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-Chloronaphthalene	PP, 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TT. 1,4 - Dioxane
M. Isophorone	8B. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	uuu Octa chloro styrene
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.

Ara	4
3/26	4
DC #: 7	DG #:

VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd Reviewer:

d 8270C)
46 Method
4 (EPA SW 84)
BNA (EP,
GC/MS BNA
METHOD

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? N/A N/A

Was a method blank analyzed for each concentration preparation level?

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: 4/08/10 Blank analysis date: 4/10/10

		7 (10x)	1400 /y 140/y	 			
		و	(440)	\			
(49)	ation	75	120/4				
1/	Sample Identification	7	1/021				
<i>∱</i> ₩		3	h/ oil				
Associated Samples:_		(XO) T	h/ 011 h/0021				
Associa		-	n/66				
sis date: य		808/1- A					
biank anaiy	Blank ID	MB 280-10808/1- A	81.9				
/kc	d d		班				
Conc. units: 49 /k	Compound						
Conc							

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

above 3

Associated Samples:

Compound Blan									
MA	Blank ID				Sı	Sample Identification	ıtion		
7	280-10=	MB 280-103684-A	6	10	11	7	(3	14	
EE 81.9	6.1		NO /4	p/ 011	n/ 011	h/001	120 /4 130 /4	130 /4	
	_				,				

5x Phthalates 2x all others

LDC# 53/26 4 24 SDG #: 500 Com

VALIDATION FINDINGS WORKSHEET Field Blanks

ار اح		
Page:	Keviewer:	2nd Reviewer:

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

Y/N N/A Were target compounds detected in the field blanks? Blank units: $\frac{\sqrt{5}}{\sqrt{6}}$ Associated sample units: $\frac{\sqrt{5}}{\sqrt{6}}$ Sampling date: $\frac{4}{\sqrt{6}}$ / $\frac{10}{\sqrt{6}}$ Y N N/A Y N N/A Blank units:

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

8-14

Sample Identification Associated Samples: BIK **火** FB-04072010-RZD 2.2 Blank ID しただ Compound

 $\frac{69}{100}$ Associated sample units: $\frac{69}{100}$ Sampling date: 4 16 6 /10 Blank units:

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

1-7 Associated Samples:

Sample Identification 4 X, F5 X04062010 - 823 Blank ID 2,7 EFE Compound

5x Phthalates 2x All others

CROL

LDC#: 73 126 AZA SDG#:

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

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

2nd Reviewer: Reviewer:_

ANN N N N/A

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

3 MOS CONTA 36 Qualifications QC Limits (Water) 21-100 10-123 3 えるろ 33-110* 20 16-110* ŝ 20-130* QC Limits (Soil) 25-121 - 120 20-130* 5 19-122 %R (Limits) S5 (2FP)= 2-Fluorophenoi S6 (TBP) = 2,4,6-Tribromophenoi S7 (2CP) = 2-Chlorophenoi-44 S8 (DCB) = 1,2-Dichlorobenzene-44 4 4 7 39 48 20 0 Surrogate TBP QC Limits (Water) 35-114 43-116 33-141 10-94 (X&) (KO) Sample ID (20x) (XX) (lox) (New) [X 9] QC Limits (Soil) 23-120 30-115 18-137 24-113 a 4 σ ٥ Ø N * QC limits are advisory
S1 (NBZ) = Nitrobenzene-d5 2:
S2 (FBP) = 2-Fluorobiphenyl 31
S3 (TPH) = Terphenyl-d14 11
S4 (PHL) = Phenol-d5 2: Date #

LDC#: 79/26 Aza SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

X Reviewer:

Page: of 1

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 N/N N/A

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?

	٤.	\ 	 			—										
Qualifications	No grad (MS	, 														
Associated Samples	†	_														
RPD (Limits)	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
MSD %R (Limits)	157 (51-120)	164 (20-150)	()	()		()	()		()	()	()	()	()	()	()	()
MS %R (Limits)	()	()	()	())	()	()	()	()	())	()	()	()	()	()
Compound	SS	222														
MS/MSD ID	15/16															
# Date																

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Ĭď	Phenol	78-90%	< 35%	12-110%	< 42%	99	Acenaphthene	31-137%	<u>< 19%</u>	46-118%	<u><</u> 31%
ن	C. 2-Chlorophenol	25-102%	> 50%	27-123%	< 40%	П.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
Ē.	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	KK.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
7	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ľ.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
ď	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	77	Pyrene	35-142%	×9E >	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	<u><</u> 42%						

LDC#: 23126A2a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: 1 of ν Reviewer: $\mathcal{N}\zeta$ 2nd Reviewer: ν

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

YN NA Were field duplicate pairs identified in this SDG?

N NA Were target analytes detected in the field duplicate pairs?

Compound Name	Conc (ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	1	3	(≤ 50%)	DIII		(Parent Only)
bis(2-ethylhexyl)phthalate	93	110		17	≤360	

0	Conc (ug/Kg)	DDD	Diff	Diff Limits	Quals
Compound Name	2	7	RPD (≤50%)	DIII	DIII LIMIUS	(Parent Only)
Benzo(a)anthracene	3500U	340		3160	≤3500	
Benzo(a)pyrene	3500U	280		3220	≤3500	
Benzo(b)fluoranthene	350	700		350	≤3500	
Benzo(g,h,i)perylene	190	320		130	≤3500	
bis(2-ethylhexyl)phthalate	1200	1400		200	≤3500	
Chrysene	410	620		210	≤3500	
Fluoranthene	3500U	580		2920	≤3500	
Phenanthrene	220	330		110	≤3500	
Pyrene	320	610		290	≤3500	

Compound Name	Conc (ı	ug/Kg)	RPD	Diff	Diff Limits	Quals
OSIN POLITICA NATIO	13	14	(≤50%)	Diff	Diff Limits	(Parent Only)
Benzo(a)anthracene	23	350U	·	327	≤350	
Benzo(a)pyrene	23	350U		327	≤350	
Benzo(b)fluoranthene	74	64		10	≤360	
Benzo(g,h,i)perylene	22	350U		328	≤350	
bis(2-ethylhexyl)phthalate	120	130		10	≤360	
Chrysene	58	59		11	≤360	
Fluoranthene	46	44		2	≤360	
Octachlorostyrene	5600	5700		100	≤360	
Pyrene	37	39		2	≤360	
Hexachlorobenzene	16000	18000		2000	≤3600	

LDC#: 23126A2a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	<u> </u>	~
Reviewer:	$\Delta \sqrt{2}$	Ç
2nd Reviewer:	10	\sim

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

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

Were target analytes detected in the field duplicate pairs?

Compound Name	Con	c (ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	8	RSAK7-3BPC-FD	(≤50%)	Dill	Dir Linits	(Parent Only)
Benzo(b)fluoranthene	350U	30		320	≤360	
bis(2-ethylhexyl)phthalate	140	140		0	≤360	
Chrysene	46	54		8	≤360	
Fluoranthene	46	50		4	≤360	
Octachlorostyrene	5100	5900	8			
Phenanthrene	23	31		8	≤360	
Pyrene	28	32		4	≤360	
Hexachlorobenzene	27000	34000	23			

	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	10	SSAJ8-01-1BPC_FD	KPD (≤50%)	Dill	Differences	(Parent Only)
Benzo(a)anthracene	45	35		10	≤360	
Benzo(b)fluoranthene	110	92		18	≤360	
Benzo(g,h,i)perylene	19	17		2	≤360	
bis(2-ethylhexyl)phthalate	110	120		10	≤360	
Chrysene	190	170		20	≤360	
Fluoranthene	220	180		40	≤360	
Phenanthrene	57	44		13	≤360	
Pyrene	150	120		30	≤360	
Octachlorostyrene	21000	18000	26			
Hexachlorobenzene	74000	66000	22			

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-5

Sample Identification

SSAJ8-01-3BPC

SSAJ8-01-4BPC

SSAJ8-01-3BPCMS

SSAJ8-01-3BPCMSD

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 with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-11011/3-A	4/14/10	Bis (2-ethylhexyl) phthalate	73.6 ug/Kg	All samples in SDG 280-2131-5

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAJ8-01-3BPC	Bis(2-ethylhexyl)phthalate	320 ug/Kg	320U ug/Kg
SSAJ8-01-4BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U 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 280-2131-5

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. 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 280-2131-5	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 280-2131-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-5	SSAJ8-01-3BPC SSAJ8-01-4BPC	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 280-2131-5

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2131-5	SSAJ8-01-3BPC	Bis(2-ethylhexyl)phthalate	320U ug/Kg	А	bl
280-2131-5	SSAJ8-01-4BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2131-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET 2B

LDC #:	23126B2a	VALIDATION	COMPLETE
SDG #:	280-2131-5	_	Stage 2
Laborator	y: 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	Α	Sampling dates: 4 /6 6 /6
II	GC/MS Instrument performance check	A	
101.	Initial calibration	A	2 RSD 12 CON/101 & 25 }
IV.	Continuing calibration/ICV	A	CON / GOV & 25 }
V.	Blanks	WZ	
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	2	
XVII.	Field blanks	SM	FB = FB-04-072010-RZD (from 280-2216-2) EB = EB-04-177019-RIG3-RZD (from 380-2352)

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.

	2011					
1	SSAJ8-01-3BPC	† 11	MB 280-11011/3-A	21	31	
2	SSAJ8-01-4BPC	12		22	32	
3	SSAJ8-01-3BPCMS	13		23	33	
4	SSAJ8-01-3BPCMSD	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**	W. 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. Diethyiphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
1. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	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	WW.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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LDC#:	SDG #:

VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	2nd Reviewer:

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

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

Was a method blank analyzed for each matrix? Y X X

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

Y N/A

N N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 4 / 16 / 10

Sample Identification <u>=</u> Associated Samples: B 1/02E MB 2804 01/5-A 73.6 Blank ID EEE Compound Conc. units: Mg

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

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

5x Phthalates 2x all others

LDC# >3/26 \$726 SDG #: Co Co

VALIDATION FINDINGS WORKSHEET

Page: 1 of)

Reviewer: 2nd Reviewer:_

ks	
Blank	
Field	

Were field blanks identified in this SUG:

Were target compounds detected in the field blanks?

Blank units:

Sampling date:

Field blank type: (circle one) Field Blank / Rinsate / Other: METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

Sample Identification B125 Associated Samples: Results ED (1/m) FB (4/57) Blank ID 厅在住 Compound CRal

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

Compound	Blank ID	Sample Identification
	3333333	
CRQL		

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 6, 2010

LDC Report Date: May 20, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-6

Sample Identification

SA169-7BPC

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

Field Blank ID	Sampling Field Blank ID Date		Concentration	Associated Samples	
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2131-6	

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2131-6	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 280-2131-6

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-6	SA169-7BPC	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 280-2131-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2131-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Page: 1 of 2nd Reviewer:

Date: 18/10

280-2131-6 Laboratory: Test America

23126C2a

LDC #:

SDG #:_

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 /66 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 KSD rv
IV.	Continuing calibration/ICV	A	2 KSD r/ COV/100 £257
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	_ A	us
IX.	Regional Quality Assurance and Quality Control	N	
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	Á	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB04062010-RZB (280-2131-2)

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:

Soil

	301					
1	SA169-7BPC	11	·	21	31	
2	MB 280-11504 /-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	

23/26 C2a	25 25 25 25
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: \of \

2nd Reviewer: Reviewer:

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

V N N/A Were field blanks identified in this such that field blanks?

(Blank units: 45 / Associated sample units: 45 / Sampling date: 4 of 16

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

<u>*</u>

Sample identification 5 les Associated Samples: KS 生なる FB (4/66) Blank ID 2.7 FEF Compound

Associated sample units:_ Blank units:

Sampling date:

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

Associated Samples:

Sample Identification Blank ID Compound CROL

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 6, 2010

LDC Report Date: May 20, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-8

Sample Identification

RSAJ8-7BPC RSAJ8-6BPC RSAJ8-7BPCMS RSAJ8-7BPCMSD

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
MB280-11720/1-A	4/20/10	Bis(2-ethylhexyl)phthalate	87.2 ug/Kg	All samples in SDG 280-2131-8

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
RSAJ8-7BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg
RSAJ8-6BPC	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U 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 280-2131-8

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 280-2131-8	All compounds reported below the PQL.	J (all detects)	А	

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2131-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-8	RSAJ8-7BPC RSAJ8-6BPC	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 280-2131-8

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2131-8	RSAJ8-7BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	А	bl
280-2131-8	RSAJ8-6BPC	Bis(2-ethylhexyl)phthalate	120U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2131-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET LDC #: 23126D2a 280-2131-8 Stage 2B SDG #: Laboratory: Test America

Page: \ of / 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		Sampling dates: 4 / 6 4 / 10
11.	GC/MS Instrument performance check	Α	
111.	Initial calibration	Α	2 RSD 12
IV.	Continuing calibration/ICV	A	ca/a = 25
V.	Blanks	ŚW	
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	
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	SW	FB = FB-04072010- RZD (280-2216-2) FB = FB-04122019 R163-R2D (280-2332-2)

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

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	Soil		4		 	
1	RSAJ8-7BPC	11	MB 280-11720/1-A	21	31	
2	RSAJ8-6BPC	12		22	32	
3	RSAJ8-7BPCMS	13		23	 33	
4	RSAJ8-7BPCMSD	14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

VALIDATION FINDINGS WORKSHEET

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

	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene™	NNN. Aniline
	V. 4-Chloro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
	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
	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກດດ
	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VW.
	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 #:

VALIDATION FINDINGS WORKSHEET

Page: of Reviewer: 2nd Reviewer:

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

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

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

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

V N N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $\frac{4}{100} \frac{1}{100} \frac{1}{$

(19)

= =

Associated Samples:

Sample Identification 120 /4 2 ટ્ર A-1/02411-082 9M Blank ID 87.7 E F T Compound Conc. units:

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

	·	 	 	 	
dentification					
Sample Identification					
Sa					
Biank ID					
70					
Compound					

5x Phthalates 2x all others

26 Dra	2
5	ď
LDC #:	SDG#:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: \of 2nd Reviewer: Reviewer:

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

Were field blanks identified in this SDG?

Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Blank units:

Sampling date: 4/67/6 | 1/2/20

Sampling date: 4/67/6 | 1/2/20

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

Sample Identification 12 JES Associated Samples: 12 V Result 西 FB (4/67) Blank ID 2.7 おかみ Compound

Associated sample units:_ Blank units:

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

Sample Identification Associated Samples: Blank ID Compound

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 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-1

Sample Identification

SA110-5BPC SA110-5BPCMS SA110-5BPCMSD

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 with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-10436/1-A	4/9/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	82.0 ug/Kg 84.0 ug/Kg	All samples in SDG 280-2216-1

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	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
SA110-5BPC	Bis(2-ethylhexyl)phthalate	130 ug/Kg	130U ug/Kg

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2216-1

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 280-2216-1	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 280-2216-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2216-1	SA110-5BPC	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 280-2216-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2216-1	SA110-5BPC	Bis(2-ethylhexyl)phthalate	130U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2216-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:	23126F2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:_	280-2216-1	Stage 2B
Laborato	rv: Test America	~

Reviewer: 5/4 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 /07 /10
II.	GC/MS Instrument performance check	Á	
111.	Initial calibration	A	d Rsp r~
IV.	Continuing calibration/ICV	A	ca/a = 200
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	us s
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	SW	FB = FB04062010- RZB (280-2131-2) EB = FB 04122010- RFC1 - 022 (286 225 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

		017				
1	SA110-5BPC	11 11	MB 280- 10476/1-A	21	3	31
2	SA110-5BPCMS	12	, , , , , , , , , , , , , , , , , , ,	22	3	32
3	SA110-5BPCMSD	13		23	3	33
4		14		24	3	34
5		15		25	3	35
6		16		26	3	36
7		17		27	3	37
8		18		28	3	38
9		19		29	3	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**	W. 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. Benzyi alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol₩	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K, Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-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**	ກກກ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET

Page: _of /_ 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?

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

N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 4/64/10 Blank analysis date: 4/10/10

(19) Sample Identification A Associated Samples: 7 30 MB 280-10436/1-A 82.0 Blank ID 84.0 で下下 FFF Compound Conc. units:

date:
ık analysis
Blank
date:
extraction
ank

Associated Samples: Conc. units:

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Sample Identification				
SE				
Blank ID				
Compound				

5x Phthalates 2x all others

LDC#: 73/76 Fra

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: Reviewer:_

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

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

Blank units: 45 / L Associated sample units: 45 / L

Sampling date: 4 16 c 1/10

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

Associated Samples:

Sample Identification B 7K 5 ٨ FBO400000 RZB Blank ID 7,7 EFE Compound CRQL

Associated sample units: Sampling date: Blank units:

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

Sample Identification Associated Samples: Blank ID Compound 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 7, 2010

LDC Report Date: May 20, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-2

Sample Identification

FB-04072010-RZD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB280-10593/1-A	4/11/10	Bis(2-ethylhexyl)phthalate	2.17 ug/L	All samples in SDG 280-2216-2

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

Sample	Compound	Reported	Modified Final	
	TIC (RT in minutes)	Concentration	Concentration	
FB-04072010-RZD	Bis(2-ethylhexyl)phthalate	2.2 ug/L	2.2U ug/L	

Sample FB-04072010-RZD 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	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 280-2216-2	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 280-2216-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2216-2	FB-04072010-RZD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2216-2

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2216-2	FB-04072010-RZD	Bis(2-ethylhexyl)phthalate	2.2U ug/L	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2216-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23126G2a VALIDATION COMPLETENT
SDG #: 280-2216-2 Stage 2B
Laboratory: Test America

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 /0 > /10
11.	GC/MS Instrument performance check	A	
Ш.	Initial calibration	A	7. RSD rx
IV.	Continuing calibration/ICV	A	ca/a = 25)
V.	Blanks	SW)	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	Á	Client Free LCS /D
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	A	
XVII.	Field blanks	SM)	FB = 1

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

Water

1	FB-04072010-RZD	11	21		31	
2	MB 280-10593/1-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	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. kopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	.0000
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	РРРР.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC, tert-Butylbenzene	WWW. Ethanol	ବରବର.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	L.L. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-lsopropyltoluene	AAAA. Ethyl tert-butyl ether	unuu.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	ww.

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

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VALIDATION FINDINGS WORKSHEET

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

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".	Was a method blank analyzed for each matrix?	Was a method blank analyzed for each concentration preparation level?
e see qualifications b	N/A Was a met	N/A Was a met
Please	Z	Z >

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

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

(79) Sample Identification Associated Samples: ų ų MB 280-16593/1-A Blank ID 日三日 Compound Conc. units:

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on date:	•
Blank extraction date:	Conc. units:
Blank	Conc.

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punodu								
Con								
	Compound Blank ID Sample Identification	Blank ID						

5x Phthalates 2x all others

LDC# 23 126 6 24 See Gory SDG #:_

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of 2nd Reviewer:__ Reviewer:_

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

Sampling date: 4/67/fo
Field blank type: (circle one) Field Blank Days

Nac		ation					
		Sample Identification					
Associated Samples:		Š					
Associat			·				
er:							
Rinsate / Oth							
Field Blank		Blank ID		2.2			
e: (circle one)		nuq		FFF			
Field blank type: (circle one) Field Blank DRinsate / Other:		Compound					CRQL
) IL	ш		emilities.		 	 <u></u>	

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

Sample Identification Blank ID Compound 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 7, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-4

Sample Identification

SA110-3BPC

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2216-4

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 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 280-2216-4	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 280-2216-4

SDG Sample		Compound	Flag	A or P	Reason (Code)	
280-2216-4	SA110-3BPC	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 280-2216-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2216-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:___ 23126H2a Stage 2B SDG #: 280-2216-4 Laboratory: Test America

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 / 67/10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	7. KSD ~
IV.	Continuing calibration/ICV	A	CW /W = 25 b
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	CHOUT SUC SS A06-05-1 BPC
VIII.	Laboratory control samples	Α	us
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB04062010-R2b (280-2131-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: Soil

7				
1+	SA110-3BPC	11	21	31
2	MB 280-10714/1-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

LDC# 03/26 #26 20 02 SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

-ot -ot	3	3
Page:	Reviewer:	2nd Reviewer:

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

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

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

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

Blank units: 19 / Associated sample units: 19 / k S

Sampling date: 4 / 6 c / 10

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

Associated Samples:

Sample Identification か末 <u>X</u> FB04062010-RZB Blank ID 先出 Compound

Associated sample units: Sampling date: Blank units:

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

Sample Identification Associated Samples: Blank ID Compound 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 7, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-5

Sample Identification

SSAN7-01-1BPC SA137-3BPC SSAJ8-02-1BPC SSAJ8-02-1BPC FD

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 (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.

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	SSAJ8-02-1BPC SSAJ8-02-1BPC_FD

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 280-2216-5	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

Samples SSAJ8-02-1BPC and SSAJ8-02-1BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	555	5		
Compound	SSAJ8-02-1BPC	SSAJ8-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Bis(2-ethylhexyl)phthalate	350U	97	-	253 (≤350)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2216-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2216-5	SSAN7-01-1BPC SA137-3BPC SSAJ8-02-1BPC SSAJ8-02-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2216-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2216-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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LDC #:	23126l2a	VALIDATION COMPLETENESS WORKSHEET	Date: 5/19 /10
SDG #:	280-2216-5	_ Stage 2B	Page: <u> l</u> of <u> j</u>
Laborato	ry: Test America	-	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
l.	Technical holding times	A	Sampling dates: 4 /07 /n
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	SS A06-05-1BPC 2C5
VIII.	Laboratory control samples	Ą	105
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	CW	D = 3,4
XVII.	Field blanks	SW	FB = FB-04072010- RZD (280- 2216-2)

Note: A = Acceptable N = Not provided/applicable

SW = See worksheet

+ = + B-0407 2010 - RZC (380-2260-2) ND = No compounds detected D = Duplicate
R = Rinsate TB:

FB = Field blank

TB = Trip blank EB = Equipment blank

Validated Samples:

(oi)

	301 /			
1	SSAN7-01-1BPC	11	21	31
2	SA137-3BPC '	12	22	32
3	SSAJ8-02-1BPC p	13	23	33
4	SSAJ8-02-1BPC_FD D	14	24	34
5	MB 280-16714/-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-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-Chioroaniline	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-ethylhexy!)phthalate	TT. I.4 - DIOXANC
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. Ootachloroshyrene
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# 23/26 I 29 See Core

VALIDATION FINDINGS WORKSHEET Field Blanks

Page:__ Reviewer:_ 2nd Reviewer:_

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

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

Were target compounds detected in the field blanks?

Blank units: No /L
Associated sample units: No /C
Sampling date: 4 /o 7 /n

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

Associated Samples: 3, 4 Sample Identification **2** X50 ۲ 90 FB-64072010- RZD Blank ID 4 EFE Compound CROL

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

Compound	Blank ID	ļ	Sai	Sample Identification	no		
CRQL							

5x Phthalates 2x All others

LDC #: 73 126 I 2a VALIDATION FINDINGS WORKSHEET SDG #: See Corv Field Duplicates

Page:_	of
Reviewer:	2/6
2nd reviewer:	ト

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

P	<u>N</u>	N/A
$(\mathbf{Z}$	ΣN	N/A

	Concentration	on (45/kg)	
Compound	3	9	RPD
FEE	350 U	97	253 (= 350 D)
		1	
- 101 1500 1 1100 1 1 1 1 1 1 1 1 1 1 1 1	Concentration	nn ()	
Compound			RPD
Compound	<u> </u>	<u> </u>	NPD
	Concentration	on ()	
Compound			RPD
		<u> </u>	
	Concentration	on ()	
Compound			RPD

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 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-6

Sample Identification

SA84-5BPC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2216-6

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 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 280-2216-6	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 280-2216-6

SDG Sample		Compound	Flag	A or P	Reason (Code)	
280-2216-6	SA84-5BPC	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 280-2216-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2216-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

_DC #: 23126J2a	VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2216-6	Stage 2B
aboratory: Test America	·

Date: 5/14/16
Page: 1 of 1
Reviewer: 5/14/16
2nd Reviewer: 5/14/16

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 /0 7 /10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	A	$\frac{2 RSD}{CW/160} \stackrel{r^{r}}{=} 252$
V.	Blanks	Α	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	SM	Client spec SA 156-5BPC (No asstill sample, N
VIII.	Laboratory control samples	A	lcs
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field`duplicates	N	
XVII.	Field blanks	SW)	FB = FB04062010-RZB (280-2131-2) EB = EB-0412010-RIG1 RZB (280-2352)

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

	3 01			
1	SA84-5BPC	11	21	31
2	MB 280-10974/-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-Dichiorobenzene⁴	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-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-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	nnn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	ННН. Benzo(k)fluoranthene	WWW.

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

LDC#: 73/26 J29 See Com

VALIDATION FINDINGS WORKSHEET

Reviewer: 2nd Reviewer:_

Page:

Field Blanks

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

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

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

Shark units: 49 /L Associated sample units: 40 /L Associated sa

Sampling date: 4 /66 /th

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

Associated Samples:

Sample Identification カボ XUX 0,7 333 Compound CRQL

Associated sample units: Blank units:

Associated Samples:

	ation				
-	Sample Identification		,		
	Blank ID				
	Compound				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 7, 2010

LDC Report Date:

May 27, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2270-2

Sample Identification

SSAK8-01-1BPC

SSAK8-01-1BPC_FD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 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. 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 280-2270-2

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 280-2270-2	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAK8-01-1BPC and SSAK8-01-1BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/Kg)	DDD.	Diff		
Compound	SSAK8-01-1BPC	SSAK8-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Bis(2-ethylhexyl)phthalate	60	340U	-	280 (≤340)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2270-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2270-2	SSAK8-01-1BPC SSAK8-01-1BPC_FD	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2270-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2270-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

		rionox northgate nenderson
LDC #:	23126M2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2270-2	Stage 2B
aborato	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 .
1.	Technical holding times	. A	Sampling dates: 4 /67 /60
И.	GC/MS Instrument performance check	A	
101.	Initial calibration	A	2 RSD 17
IV.	Continuing calibration/ICV	A	2 RSD 17 COV/101 6253
V.	Blanks	А	
VI.	Surrogate spikes	Á	
VII.	Matrix spike/Matrix spike duplicates	A	SS AK 3-03-1BPC; RSAI 2-12BPC
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	W2	$D = I, \gamma$
XVII.	Field blanks	SM	FB = FB-04672010 - RZD (280-2216-2)

Note:

A = Acceptable

SW = See worksheet

N = Not provided/applicable

ND = No compounds detected D = Duplicate

R = Rinsate FB = Field blank TB = Trip blank EB = Equipment blank

Validated Samples:

Cxt)

·	3811				
1	SSAK8-01-1BPC	11	21	3	31
2	SSAK8-01-1BPC_FD	12	22	3	32
3	MB 280-10 760 /-A	13	23	3	33
4		14	24	3	34
5		15	25	3	35
6		16	26	3	36
7		17	27	3	37
8		18	28	3	38
9		19	29	3	99
10		20	30	4	ю

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz (a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene⁴	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TT. 1.4- Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. octachloostyrene
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.

See Con LDC #: 29 202 M 20

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: 2nd Reviewer:_ Reviewer:

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

Y N N/A Were field blanks identified in this succession of the field blanks?

Were target compounds detected in the field blanks?

Blank units:

Associated sample units:
Sampling date: 4 /oz /to

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

Sample Identification Associated Samples: Vex FB 2 b FB-04072010, RZD Blank ID 2:2 田 Compound CROL

Associated sample units: Blank units:

Associated Samples:

г									
	Sample Identification								
resoluted cumples.	Sample								
JOSEL .									
									:
TO IN LAND	a								
	Blank ID								
ישני (מוומוכ ס	Compound								
icia piano gpe: (chere ene) i icia ciano i meace ene:	Comp								CROL
_ [<u> </u>	88888	<u> </u>	<u> </u>	<u> </u>	<u></u>	<u> </u>	L	U

5x Phthalates 2x All others

LDC #: 23/26 M2a SDG #: Sa Com

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page:_	1_of/_
Reviewer:	W
2nd reviewer:	h

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

/	N(Y)	N/A
	УN	N/A

Were field duplicate pairs identified in this SDG?
Were target compounds identified in the field duplicate pairs'

L	Concentrat	ion (Mg /leg)	
Compound	1	γ	RPD
EEE	60	340 U	280 (= 340 D)
	<u>, , , , , , , , , , , , , , , , , , , </u>		
	Concentrat	ion ()	
Compound			RPD
	W5-05-6		
<u> </u>	Concentrat	ion ()	
Compound			RPD
<u> </u>	Concentrat	ion ()	_
Compound			RPD

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-1

Sample Identification

SSA05-03-1BPC

SSAO5-03-5BPC

SSAO6-04-5BPC

SSAO6-05-1BPC

SSA06-05-5BPC

SSAO6-05-5BPC-FD

SSAO6-05-1BPCMS

SSAO6-05-1BPCMSD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (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 EB-04072010-RZC (from SDG 280-2383-1) 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-04072010-RZC	4/8/10	Bis(2-ethylhexyl)phthalate	2.4 ug/L	All samples in SDG 280-2280-1

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 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 280-2280-1	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAO6-05-5BPC and SSAO6-05-5BPC-FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	555	Diff		
Compound	SSAO6-05-5BPC	SSAO6-05-5BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Bis(2-ethylhexyl)phthalate	350U	90	-	260 (≤350)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2280-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-1	SSAO5-03-1BPC SSAO5-03-5BPC SSAO6-04-5BPC SSAO6-05-1BPC SSAO6-05-5BPC SSAO6-05-5BPC-FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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LDC #: 23126N2a	_ VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2280-1	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
l.	Technical holding times	A	Sampling dates: 4 /6 8 /no
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD r~ CCV /W = 25 8
IV.	Continuing calibration/ICV	A	COV /W = 258
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	US
IX.	Regional Quality Assurance and Quality Control	N	
X	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Δ	
XVI.	Field duplicates	SW	D = 5,6
XVII.	Field blanks	SW	FB = FB - 04072010 - RZC (280_2280-2)

EB = EB - 04072010- RZC (280 - 2383-1)

A = Acceptable Note:

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:

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-	عد					
1	SSAO5-03-1BPC	11	MB 280-10714/-A	21	31	
2	SSAO5-03-5BPC	12		22	32	
3	SSAO6-04-5BPC	13		23	 33	
4	SSAO6-05-1BPC	14		24	34	
5	SSAO6-05-5BPC 1/2	15		25	35	
6	SSAO6-05-5BPC-FD D	16		26	36	
7	SSAO6-05-1BPCMS	17		27	37	
8	SSAO6-05-1BPCMSD	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	тт. 1,4-Дібхаце
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. Octachlorostyrene
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# 22126 NVA SDG#:

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer.

Page:

2nd Reviewer:

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

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

Were target compounds detected in the field blanks? Sampling date: 468 /D Blank units: 149

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

14 Associated Samples:

ıtion					-	
Sample Identification) 5)k)				
8		(> SX BIK)				
		(N)		,		
			-			
	910-RZC	•				
Blank ID	EB-04072010-RZC	EFE 2,4	-			
puno		CEE				
Compound						CRQL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

Associated Samples

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mples:	Sample Identification						
Associated Samples.	Sa						
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e: (circie orie	pund						
rield Dialik Lype: (circle Orie) rield Dialik / Kilisate / Otifer.	Compound						CROL
L [<u></u>	8888	<u> </u>	 	<u> </u>		

5x Phthalates 2x All others

LDC #: 73 126 N29 VALIDATION FINDINGS WORKSHEET SDG #: Sec Correct Field Duplicates Field Duplicates

Page:_	<u> </u> of
Reviewer:_	N/
2nd reviewer:	1

	Componentian	us legs	
	Concentration		
Compound	5	6	RPD RPD
EEE	350 U	90	760 (£ 350 D)
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	Concentration	41	
Compound			RPD RPD
And the second s			
	<u></u>		
			
	Concentration		
Compound			RPD
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	Concentration	() 	
Compound			RPD
	1		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 20, 2010

Matrix:

Water

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-2

Sample Identification

FB-04072010-RZC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (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-RZC was identified as a field blank. No semivolatile contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 280-2280-2	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2280-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-2	FB-04072010-RZC	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 280-2280-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox Northqate Henderson

_DC #:23126O2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: <u>280-2280-2</u>	Stage 2B
_aboratory:_Test America	_

Reviewer: 3V4 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	Α	Sampling dates: 4 /0 8 /10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD Y
IV.	Continuing calibration/ICV	A	ca ha & 25)
V.	Blanks	A	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	client spec
IX.	Regional Quality Assurance and Quality Control		
X.	Internal standards	λ	
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	MD	FB = 1

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water

1	FB-04072010-RZC	11	21	31	
2	MB 280- 11077/4-A	12	22	32	
3	· ·	13	23	33	
4	707-00-00-00-00-00-00-00-00-00-00-00-00-	14	24	34	
5		15	25	35	Palar.
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-4

Sample Identification

SSAO5-02-1BPC**

SSAO5-02-1BPC FD

SSAO5-03-2BPC**

SSAK2-01-1BPC**

SSAK2-01-1BPC FD

SSAK3-02-1BPC**

SSAK3-03-1BPC**

SSAK3-04-1BPC**

SSAK3-04-1BPC FD

RSAI2-12BPC**

SSAO6-04-1BPC**

SSAO6-04-1BPC FD

SSA07-01-1BPC**

SSAO7-01-1BPC FD

SSAK3-03-1BPCMS

SSAK3-03-1BPCMSD

RSAI2-12BPCMS

RSAI2-12BPCMSD

^{**}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 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Sample EB-04072010-RZC (both from SDG 280-2383-1) 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-04072010-RZC	4/8/10	Bis(2-ethylhexyl)phthalate	2.4 ug/L	SSAO5-02-1BPC** SSAO5-02-1BPC_FD SSAO5-03-2BPC** SSAO6-04-1BPC** SSAO6-04-1BPC_FD SSAO7-01-1BPC_FD

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

Samples FB-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	SSAK2-01-1BPC** SSAK2-01-1BPC_FD SSAK3-02-1BPC** SSAK3-03-1BPC** SSAK3-04-1BPC** SSAK3-04-1BPC_FD RSAI2-12BPC**

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. Surrogate recoveries (%R) were not within QC limits for samples SSAO6-04-1BPC** and SSAO6-04-1BPC_FD. 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 within QC limits.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2280-4	All compounds reported below the PQL.	J (all detects)	Α

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 4review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAO5-02-1BPC** and SSAO5-02-1BPC_FD, samples SSAK2-01-1BPC** and SSAK2-01-1BPC_FD, samples SSAK3-04-1BPC** and SSAK3-04-1BPC_FD, samples SSAO6-04-1BPC** and SSAO6-04-1BPC_FD, and samples SSAO7-01-1BPC** and SSAO7-01-1BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentra	200				
Compound	SSAK3-04-1BPC**	SSAK3-04-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachiorobenzene	72	59	-	13 (≤350)	. <u>-</u>	-
Bis(2-ethylhexyl)phthalate	350U	190	-	160 (≤350)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2280-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-4	SSAO5-02-1BPC** SSAO5-02-1BPC_FD SSAO5-03-2BPC** SSAK2-01-1BPC_FD SSAK3-02-1BPC** SSAK3-03-1BPC** SSAK3-04-1BPC** SSAK3-04-1BPC_FD RSAI2-12BPC** SSAO6-04-1BPC_FD SSAO7-01-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2280-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2280-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2280-4

No Sample Data Qualified in this SDG

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	Tronox from gato from a cross
LDC #: 23126P2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2280-4	Stage 2B ∕ዻ
Laboratory: Test America	

Page:__lof_ Reviewer: 2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/65/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	
V.	Blanks	A	
VI.	Surrogate spikes	Sh)	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	MA	
XII.	Compound quantitation/CRQLs	NA	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	# A	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	NZ	$D_{1} = 1.2 D_{2} = 4/5 D_{3} = 8.9 D_{4} = 11, 17 D_{5} = 13, 14$ $F_{1} = F_{2} = 64672010 - R_{2}C (266 - 2266 - 2)$ $F_{2} = F_{3} = 64672010 - R_{2}D (280 - 2216 - 2)$
XVII.	Field blanks	SW	FB = F8-04072010- RZC (280-2216-2) - FB-04072010- RZD (280-2216-2)

EB = EB-0407260 -RZC (280-2383-1) ⊀ND = No compounds detected D = Duplicate Note: A = Acceptable

R = Rinsate N = Not provided/applicable TB = Trip blank SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:

4*	level IV so	<u> </u>					
1	SSAO5-02-1BPC	ρ,	11	SSAO6-04-1BPC De	21	MB 280- 10760 /-A	31
2	SSAO5-02-1BPC_FD	\boldsymbol{p}_{j}	12	SSAO6-04-1BPC_FD	22	*****	32
3	SSA05-03-2BPC * *		13	SSAO7-01-1BPC → × p ⋅	23		33
4	SSAK2-01-1BPC	P _V	14	SSAO7-01-1BPC_FD	24		34
5	SSAK2-01-1BPC_FD	D_{1	15	SSAK3-03-1BPCMS	25		35
6	SSAK3-02-1BPC ¥⊁		16	SSAK3-03-1BPCMSD	26		36
7	SSAK3-03-1BPC → ¥		17	RSAI2-12BPCMS	27		37
8	SSAK3-04-1BPC	D3	18	RSAI2-12BPCMSD	28		38
9	SSAK3-04-1BPC_FD	Ďз	19		29		39
10	RSAI2-12BPC		20		30		40

VALIDATION FINDINGS CHECKLIST

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	103	140		
All technical holding times were met.				
Cooler temperature criteria was met.	-			
II. GC/MS Instrument performance check				and the second s
Were the DFTPP performance results reviewed and found to be within the specified criteria?	_			
Were all samples analyzed within the 12 hour clock criteria?				
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	_	_		
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	_			
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	_			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		.		
V. Blanks		-		
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				AL STATE OF THE ST
Were all surrogate %R within QC limits?	·			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	/			
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			-	
VII. Matrix spike/Matrix spike duplicates				Control of the Contro
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?	/			
Vill. Laboratory control samples			í	
Was an LCS analyzed for this SDG?	<u> </u>	<u> </u>	<u> </u>	

LDC #: 73/26 P2~ SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 30 2nd Reviewer: _____

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?		-		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		_	_	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internal standards			· · · · ·	
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?			_	
XI. Target compound identification				A STATE OF THE STA
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			<u> </u>	
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			_	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/		
XIV. System performance				The second secon
System performance was found to be acceptable.	/			
XV- Overall assessment of data 1/1/2				
Overall assessment of data was found to be acceptable.		<u> </u>		
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.		ł		
XVII. Field blanks				
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF, 3-Nitroaniline	UU, Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
G. 2-Chiorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroaniline	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-Methyinaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyi alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111. 1,4. Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. Octa chloro stynne
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenoi	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)ทีนoranthene	www.

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

LDC#: 23126 P29 SDG #: Se Com

VALIDATION FINDINGS WORKSHEET Field Blanks

2nd Reviewer:_ Page:__ Reviewer:_

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

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

Blank units: wo / Associated sample units: wo / Associated sample

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

Associated Samples:

	_	_	 	 	
ion					
Sample Identification		>/K)			
Sa		ND or > 5x bk)			
		ND or			
		()			
	0- RZD				
Biank ID	FB-04073010- RZD	イ, ス			
		<i>13.3</i>			
Compound					CROL

45 /L Associated sample units: 45 /cs Blank units:

Sampling date: 4 /o8/lo Field blank type: (circle one) Field Blank / Rinsate / Other:

- 3

nk type: (circle one)	Field Blank	Field blank type: (circle one) Field Blank / Rinsate / Other: Compound Blank ID	7	Associated Samples: Sample Identification	ntification	+	
# E	EB-04072010-RZC	10-R2C					
-	EEE 2.4		(ND	ND or > 5x BIR) (
	-						

5x Phthalates 2x All others

23/26 PZa

VALIDATION FINDINGS WORKSHEET SDG #: See Construction Surrogate Recovery METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Reviewer: 7/6 Page: lof

2nd Reviewer:

Y N N/A

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

Qualifications QC Limits (Water) 21-100 gual (021-05 (951 -12 Naned %R (Limits) 0 All except Surrogate NBZ 2 QC Limits (Water) 35-114 Sample ID . xo1) 10X ત Date #

S5 (2FP)= 2-Fluorophenol S6 (TBP) = 2,4,6-Tribromophenol S7 (2CP) = 2-Chlorophenol-d4 S8 (DCB) = 1,2-Dichlorobenzene-d4 43-116 33-141 10-94 QC Limits (Soil) 23-120 30-115 18-137 24-113 * QC limits are advisory
S1 (NBZ) = Nitrobenzene-d5 2:
S2 (FBP) = 2-Fluorobiphenyl 3
S3 (TPH) = Terphenyl-d14 1
S4 (PHL) = Phenol-d5 2

20-130* QC Limits (Soil) 25-121 20-130* 19-122

33-110* 16-110* 10-123

LDC#: 23/26 P2a SDG #: See Com

VALIDATION FINDINGS WORKSHEET **Field Duplicates**

Page:_	of
Reviewer:	316
2nd reviewer:	

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

$\widehat{\mathbf{Y}}$	N	N/A
	N	N/A

Were field duplicate pairs identified in this SDC2

were neid duplicate pairs identified in this 5DG?
Were target compounds identified in the field duplicate pairs?

	Concentration	ug /Fg	
Compound	8	9	RPD
22	72	59	13 (63500)
FFE	350 U	190	160

	Concentration (
Compound		RPD

	Concentration ()	
Compound		RPD

	Concentration (
Compound		RPD

LDC# 23126 Pra SDG #: 54 (2)

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

ģ Page: Reviewer: 2nd Reviewer:

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

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

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

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

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

X = Mean of the RRFs

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

#

S= Standard deviation of the RRFs,

Recalculated %RSD 11.69 11.20 10.66 3.42 7.68 5.71 Reported %RSD 11.2 11.7 10.7 3.4 5.7 7.7 Recalculated Average RRF 0.5719 0.2432 1.0410 (Initial) 0.9822 1.2462 1.0281 Average RRF Reported 0.5719 0.2432 1.0410 (Initial) 0.9822 1.2461 1.0281 Recalculated 50 std) 1.3050 0.2559 1.0610 1.1036 0.5725 1.0312 RRF Reported 50 std) 0.5725 1.0312 0.2559 1.0610 1.1036 1.3050 RRF (183) (IS1) (IS2) (184) (185) (186) Compound (Internal Standard) Hexachlorobenzene Benzo(a)pyrene Naphthalene 1,4-Dioxane Chrysene Fluorene 4/13/2010 Calibration Date Standard ID MSS K CAL

•						
Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	6609'0	1.1409	1.3747		1.1807	0.9292
10.00	0.5857	1.0702	1.3919	0.2646	1.1392	1.0099
20.00	0.5807	1.0728	1.3882	0.2598	1.1556	1.0972
50.00	0.5725	1.0312	1.3050	0.2559	1.0610	1.1036
80.00	0.5572	0.9598	1.2199	0.2461	1.0154	1.0631
120.00	0.5574	0.9097	1.1599	0.2364	0.9617	1.0333
160.00	0.5534	0.8529	1.0870	0.2245	0.9268	0.9979
200.00	0.5580	0.8202	1.0426	0.2150	0.8874	0.9906
×	0.5719	0.9822	1.2462	0.2432	1.0410	1.0281
S=	0.0195	0.1148	0.1395	0.0187	0.1110	0.0587

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

LDC # 25/26 P26 SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page of 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

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

Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)		(Initial RRF)	(CC RRF)	(CC RRF)	%D	0%
1	D3996	04/16/10	1,4-Dioxane	(181)	0.5719	0.5422	0.5422	5.2	5.2
			Naphthalene ((185)	0.9822	0.9549	0.9549	2.8	2.8
			Fluorene ((183)	1.2461	1.2271	1.2271	1.5	1.5
			Hexachlorobenzene (I	(184)	0.2432	0.2442	0.2442	0.4	0.4
			Chrysene (I	(185)	1.0410	1.0164	1.0164	2.4	2.4
			Benzo(a)pyrene (I	(9SI)	1.0281	1.0477	1.0477	1.9	1.9

Compound (Reference IS)	(S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(181)	40/80	218127	201167
Naphthalene	(182)	40/80	1533221	802846
Fluorene	(183)	40/80	1213581	494495
Hexachlorobenzene	(184)	40/80	436103	892871
Chrysene	(185)	40/80	2100765	1033434
Benzo(a)pyrene	(981)	40/80	2251279	1074358

23126 176 SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof_1_
Reviewer:	JVC
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	(50	98.1	98	95	D
2-Fluorobiphenyl	ì	95.4	95	95	
Terphenyl-d14		102.7	103	10>	
Phenol-d5	15,0	151.5	101	101	
2-Fluorophenol		14 4.9	27	97	
2,4,6-Tribromophenol	J	151.1	161	101	1
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

23/26 P29 SDG #: Tee LDC#:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Reviewer:_ 2nd Reviewer: Page:

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

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

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

Where:

SC = Sample concentation

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

SSC = Spiked sample concentration SA = Spike added

MSD = Matrix spike duplicate percent recovery

MS = Matrix spike percent recovery

MS/MSD samples:

	Sp	ike	Sample	Spiked 5	ample	Matrix Spike	Spike	Matrix Spik	Matrix Spike Duplicate	MS/MSD	G,
Compound) (US)	Added (Ug/Rg)	Concentration (Mg /kc)	Concentration (45/Ex)	tration (k.)	Percent Recovery	ecovery	Percent Recovery	Recovery	RPD	
	MS	/ MSD		MS	MSD	Renorted	Recalc	Reported	Recalc	Reported	Recetoulated
Phenol											
N-Nitroso-di-n-propyiamine											
4-Chlora-3-methylphenol											
Acenaphthene	2860	2880	Q	2380	7260	80	86	79	79		
Pentachlorophenol											
Pyrene	2860	1880	9)	240	25.70	7 8	9	89	89	3	n
	:										

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 #: 1.12 1 29 SDG #: See Coner

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

Reviewer: We

Page: lof 1 2nd Reviewer:__

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

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

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration SA = Spike added

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

LCS/LCSD samples: __

KS 280-1076/2-4

	ďS	ike	ďS	ike	SOT	Ş	01	I CSD	I CS/	CS/I CSD
Compound	Adi A	Added (hS /lex)	Concer (W)	Concentration (vろ /に)	Percent Recovery	ecovery	Percent Recovery	ecovery	R	RPD
	1.08	I CSD	SUL	ر LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2660	NA	2220	MA	48	83.5				
Pentachiorophenol					-					
Pyrene	2660		0052		44	44				
					-		<i>></i>			
								-		

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

LDC#:_	93	126	þ	×
SDG #:	Sce	Cn-		

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u> 1</u> 01 <u>1</u>
Reviewer:_	JU
2nd reviewer:	

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

YNN	N/A We	ere all reported results recalculated and verified for all level IV samples?
YNN	V/A We	ere all recalculated results for detected target compounds agree within 10.0% of the reported results?
7/		

Concentration = $(A_i)(I_i)(V_i)(DF)(2.0)$ Example: $(A_{is})(RRF)(V_o)(V_i)(\%S)$ Sample I.D. #3 Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Conc. = (171178)(40)(1ml)(1000)()
(866282)(6.24,2)(30.19)(5.93))()) Amount of internal standard added in nanograms (ng) Volume or weight of sample extract in milliliters (ml) or grams (g). Volume of extract injected in microliters (ul) Volume of the concentrated extract in microliters (ul) ~ 1100 mg/fg Df Dilution Factor. Percent solids, applicable to soil and solid matrices only. %S

Factor of 2 to account for GPC cleanup 20

2.0	= Factor of 2 to accoun	it for GPC cleanup				
#	Sample ID	Compound		Reported Concentration ()	Calculated Concentration ()	Qualification
		17/14/0				
						·
	·		-			
				•		
			-			
	· · · · · · · · · · · · · · · · · · ·	<u> </u>	·		L	li

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-5

Sample Identification

SSAO4-02-3BPC

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.

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.
- 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-04072010-RZC (from SDG 280-2383-1) 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-04072010-RZC	4/7/10	Bis(2-ethylhexyl)phthalate	2.4 ug/L	All samples in SDG 280-2280-5

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 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

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 280-2280-5	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 280-2280-5

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-5	SSAO4-02-3BPC	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 280-2280-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2280-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2280-5

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VAI	IDATION COMPLETENESS WORKSHEET
	Stage 28 4

Date:	5/19/10
Page:_	<u>l</u> of
Reviewer:	_ SVC
2nd Reviewer:	\ <u>_</u>

(780-7352)

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 /08 /10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	3 RSD r
IV.	Continuing calibration/ICV	A	2 RSD r√ CCV/1CV ≤ 25 %
V.	Blanks	Α	
VI.	Surrogate spikes	A	
· VII.	Matrix spike/Matrix spike duplicates	SW	Chient Spec SAISU-SBPC (No asslid sample, No
VIII.	Laboratory control samples	4	LC2
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	Ν	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	Z	/EB= EB-04072016- RZC (280-2383-1)
XVII.	Field blanks	Z M	/EB = EB-04072010- RZC (280-2383-1) [FB = FB-04072010- RZC (280-2266-2)

A = Acceptable Note:

LDC #: 23126Q2a

Laboratory: Test America

__280-2280-5

SDG #:_

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

1:02

	201				
1	SSAO4-02-3BPC	11	21	31	
2	MB 280-10974/1-4	12	22	32	
3	1	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 CHECKLIST

Page: 1 of 2 Reviewer: JW 2nd Reviewer: ____

Method: Semivolatiles (EPA SW 846 Method 8270C)

Metriod. Serrivolatiles (LFA SVV 646 Wetriod 6270C)	Ī	Ī		
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		Ī		
All technical holding times were met.				
Cooler temperature criteria was met. II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	_			
Were all samples analyzed within the 12 hour clock criteria?				
III. Initial calibration				145. W
Did the laboratory perform a 5 point calibration prior to sample analysis?		<u> </u>		
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?		<u> </u>		
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	_			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	/			
V. Blanks		1 (1)	I	
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				16 19 - Carlotte Carlotte (1997) - 1997 18 - Carlotte Carlotte (1997) - 1997
Were all surrogate %R within QC limits?	_			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			_	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	7			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	oxdot	<u> </u>	L	

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 577 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	ı	ı		
Were performance evaluation (PE) samples performed?		_	_	
Were the performance evaluation (PE) samples within the acceptance limits? X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?		ł		
Were retention times within ± 30 seconds from the associated calibration standard? XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	_	ļ	ļ	
Were chromatogram peaks verified and accounted for? XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		1		
XIV. System performance		ı	T	
System performance was found to be acceptable.		<u> </u>		
XV. Overall assessment of data	T	T	T	
Overall assessment of data was found to be acceptable.		<u> </u>		
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	<u> </u>			
Target compounds were detected in the field duplicates.				
XVII. Field blanks				
Field blanks were identified in this SDG.		×	1	
Target compounds were detected in the field blanks.	/	<u>1</u>		

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC# 72/26 B29 SDG #:

VALIDATION FINDINGS WORKSHEET

Page: of /

Reviewer:_ 2nd Reviewer:_

Field Blanks

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)	Were field blanks identified in this SDG?	Were target compounds detected in the field blanks?
THOD: GC/MS E	N N/A Wei	N N/A Wei
E	\succ	\nearrow

Blank units: 4 / Associated sample units: 4 / Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date:

#

1							
T¥	on					·	
amples:	Sample Identification						
Associated Samples:	0,		75× 8K)				
			×5	ر ا			
#B							
Rinsate / Other		EB-04672010- RZG					
Field Blank	Blank ID	EB-04672	2.4	_			
ield blank type: (circle one) Field Blank Rinsate / Other:	Compound		3 <u>3</u> 9)RaL

Associated sample units: Blank units:

Sampling date:_

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

Sample Identification Blank ID Compound

Associated Samples:

CRAL

5x Phthalates 2x All others

SDG# 9-1

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

\ of Page: Reviewer: 2nd Reviewer:

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

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

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

 A_x = Area of Compound

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

average RRF = sum of the RRFs/number of standards

S= Standard deviation of the RRFs,

 $C_x = Concentration of compound,$

X = Mean of the RRFs

%RSD = 100 * (S/X)

Recalculated %RSD 3.01 5.04 8.17 69.9 Reported %RSD 6.9 3.0 5.0 8.2 6.7 Recalculated Average RRF 0.5862 1.1134 1.3225 1.0065 1.0885 (Initial) 0.2487 Average RRF Reported 0.5862 (Initial) 1.1134 0.2488 1.0065 1.3224 1.0885 Recalculated (50 std) 1.3445 0.5882 0.2412 1.1221 1.0697 1.1044 RRF Reported (50 std) 1.3445 0.5882 0.2412 1.1044 1.1221 1.0697 RRF (181) (182) (183) (IS4) (185) (186) Compound (Internal Standard) Hexachlorobenzene Benzo(a)pyrene Naphthalene 3/18/2010 1,4-Dioxane Fluorene Chrysene Calibration Date Standard ID

MSS D SAL

#

nnc IS/Cpd Area cpd Area IS 40/50 292285 397528 40/50 1966829 140219 40/50 1609531 957696 40/50 483347 160289 40/50 2492854 186428 40/50 2472315 179094			
292285 1966829 1609531 483347 2492854 2472315	nc IS/Cpd	Area cpd	Area IS
1966829 1609531 483347 2492854 2472315	40/20	292285	397528
1609531 483347 2492854 2472315	40/20	1966829	1402196
483347 2492854 2472315	40/20	1609531	957696
2492854	40/20	483347	1602894
2472315	40/20	2492854	1864283
	40/20	2472315	1790944

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.6542	1.1382	1.2049		1.0249	0.9762
10.00	0.6168	1.1444	1.2482	0.2132	1.0017	1.0038
20.00	0.5587	1.1266	1.2972	0.2367	1.0484	1.0453
50.00	0.5882	1.1221	1.3445	0.2412	1.0697	1.1044
80.00	0.5191	1.0774	1.3440	0.2492	1.0741	1.1019
120.00	0.5793	1.1406	1.3805	0.2535	1.0559	1.1505
160.00	0.5706	1.1068	1.3878	0.2641	0.9457	1.1705
200.00	0.6029	1.0507	1.3725	0.2833	0.8319	1.1554
×	0.5862	1.1134	1.3225	0.2487	1.0065	1.0885
S	0.0403	0.0335	0.0666	0.0221	0.0822	0.0728

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

LDC # 75 /26 & 29 SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page \of_)

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

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

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

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

Ax = Area of compound

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

Ais = Area of associated internal standard Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	Q%	%D
1	D3996	04/16/10	1,4-Dioxane (IS1)	0.5862	0.5805	0.5805	1.0	1.0
			Naphthalene (IS2)	1.1134	1.1128	1.1128	0.1	0.1
			Fluorene (IS3)	1.3224	1.3203	1.3203	0.2	0.2
			Hexachlorobenzene (IS4)	0.2488	0.2542	0.2542	2.2	2.2
		:	Chrysene (IS5)	1.0065	1.0377	1.0377	3.1	3.1
			Benzo(a)pyrene (IS6)	1.0885	1.2035	1.2035	10.6	10.6
					:			
_								

Compound (Reference IS)	18)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	453857	390903
Naphthalene	(182)	40/80	3177574	1427715
Fluorene	(183)	40/80	2697204	1021471
Hexachlorobenzene	(184)	40/80	868351	1708342
Chrysene	(185)	40/80	4195266	2021491
Benzo(a)pyrene	(981)	40/80	4035191	1676408
			-	

LDC #: 03 124 0 m SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	tott
Reviewer:	M
2nd reviewer:	\sim

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	62.8	63	66	0
2-Fluorobiphenyl		66.4	66	G C	,
Terphenyl-d14	1	85.3	85	85	
Phenol-d5	150	19.5	77 66	66	
2-Fluorophenol		96.4	7 64	64	
2,4,6-Tribromophenol		91.6	61	61	
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

LDC# 125 & SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Reviewer: (1) Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

2nd Reviewer: Page: Lof 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 = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCS 280-10974 12-A LCS/LCSD samples: __

	Spi	ke	ďS	ike	01	CS	ย	csn	I CS/I	CS/LCSD
Compound	Added (W5/E	Jed Je	Concentration $(\frac{1}{16})$	ntration /ec)	Percent Recovery	всочегу	Percent F	Percent Recovery	RPD	Ō
	108	l CSD	1.08	Q	Reported	Recalc	Reported	Recalc	Reported	Recalculated
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
	2450	XX	1950	2	79	79				
Pentachlorophenol						-				
	2450		2357		26	96				
				_						

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

LDC #:	73	126	Q	ya
SDG #: .	Sre	Corre	1	

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof1_
Reviewer:	No
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METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $(A_s)(I_s)(V_s)(DF)(2.0)$ $(A_{ss})(RRF)(V_s)(V_s)(%S)$

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

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

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

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

V₁ = Volume of extract injected in microliters (ul)

V, = Volume of the concentrated extract in microliters (ul)

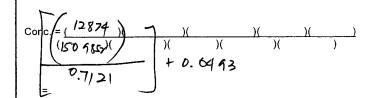
Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #



 $= \frac{0.06127 (40) (1000)}{(31.19) (0.908)}$

2.0		it for GFC cleanup		Reported Concentration	Calculated Concentration	
#	Sample ID	Compound	6.4	()	()	Qualification
			= 86	79		
			~ 8-	7 us la		
			~ /	7,0		
	-					
				:		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-7

Sample Identification

RSAI2-14BPC

RSAI2-14BPCMS

RSAI2-14BPCMSD

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.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
All samples in SDG 280-2280-7	All TCL compounds	16	14	J- (all detects) UJ (all non-detects)	Р

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

II. GC/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
MB280-12380/1-A	4/24/10	Bis(2-ethylhexyl)phthalate Diethylphthalate	91.7 ug/Kg 48.9 ug/Kg	All samples in SDG 280-2280-7

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
RSAI2-14BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
	Diethylphthalate	40 ug/Kg	40U 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 280-2280-7

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

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 280-2280-7	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 280-2280-7

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-7	RSAI2-14BPC	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
280-2280-7	RSAI2-14BPC	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 280-2280-7

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2280-7	RSAI2-14BPC	Bis (2-ethylhexyl) phthalate Diethylphthalate	100U ug/Kg 40U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2280-7

No Sample Data Qualified in this SDG

Tronox Northgate Henderson KSHEET

LDC #: 23126T2a	VALIDATION COMPLETENESS WOR
SDG #: 280-2280-7	Stage 2B 4
Laboratory: Test America	

Page: 1of 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	SW	Sampling dates: 4 /68 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	Z RSD VY
IV.	Continuing calibration/ICV	A	CW /W = 25 }
V.	Blanks	SW	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	MA	
XII.	Compound quantitation/CRQLs	WA	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	АК	
XV.	Overall assessment of data	Α	
XVI.	Field duplicates	N	
XVII.	Field blanks	SM	FB = FB - 04072010 - RZD (280 - 2216 - 2) $FB = FB - 04124010 - RZD (280 - 2216 - 2)$

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Coil

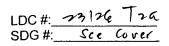
	2011				 	
1	RSAI2-14BPC	11	2	21	31	
2	RSAI2-14BPCMS	12	2	22	32	
3	RSAI2-14BPCMSD	13	2	23	33	
4	MB 280- 12380 /-A	14	2	24	 34	
5	/	15	2	25	35	
6		16	2	26	36	
7		17	2	27	37	
8		18	2	28	38	
9		19	2	29	39	
10		20	3	30	 40	

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 3/6
2nd Reviewer: ______

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				, and the second
All technical holding times were met.	`	_		
Cooler temperature criteria was met.				
II. GC/MS Instrument performance check			***	g de la company
Were the DFTPP performance results reviewed and found to be within the specified criteria?	/			
Were all samples analyzed within the 12 hour clock criteria?				
III, Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?			 	
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	/			7877
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	/	- 1		· ·
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/	W		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	/			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			_	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates	ı			A CONTROL OF THE CONT
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	



VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 36
2nd Reviewer: 5

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			í –	
Were performance evaluation (PE) samples performed?			ļ.,	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internal standards		1	1	
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification	, ,			
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	/			4-4-4-1
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	1			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TICs)				The state of the s
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			•	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		-		
XIV. System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data				processors of the second secon
Overall assessment of data was found to be acceptable.		1		
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.			-	
XVII. Field blanks	_		T	
Field blanks were identified in this SDG.		<u> </u>		
Target compounds were detected in the field blanks.		1		

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. 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-Chioroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT. 1,4-Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. octachlorosty rene
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenoi	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	126	_72a
SDG #:_	٤	ec	Com

VALIDATION FINDINGS WORKSHEET Technical Holding Times

	Page:_	lof	
	Reviewer:	N(0
2nd	Reviewer:	h	_

All-circled dates have exceeded the technical holding times.

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

		W 846 Method				Total #	
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	of Days	Qualif
A/)	5	N	4 /08 KO	4/24/0	4/26/10	16	J-/N3
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FECHNICAL HOLDING TIME CRITERIA

Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days. Nater:

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22/26	٦٥٦
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	2nd Reviewer:

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

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	Was a method blank analyzed for each matrix
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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. In date: #/24 /o Blank analysis date: 4 /26 /o Y Y N/A

Blank extraction date: 4/24 1/10 Blank analysis date: 4

(79)Sample Identification <u>-</u> 4 Associated Samples: 2 2 100 4 MB 280-12380/1-A 48.9 Blank ID 91.7 モモド NO PEC Compound Conc. units:

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

Conc. units:	Compound					
	Blank ID					
Associated Samples:						
es:	S					
	Sample Identification					
	ion					
					-	

5x Phthalates 2x all others

LDC#: 77 126 T29 SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer:_ Page: 2nd Reviewer:_

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

Y N N/A

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

Blank units: N5 / Associated sample units: V5 / Associated sample u

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

Associated Samples:

Sample Identification A X Blank ID Fb - 04 0720 16 - RZD 7.7 年年年 Compound CROL

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

Associated Samples:

	" in a nici i (c		
Compound	Blank ID	Sample Identification	
CRQL			

5x Phthalates 2x All others

23/26 +29 SDG#: LDC #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page:

Reviewer: 2nd Reviewer:

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

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

 $RRF = (A_{\nu})(C_{\nu})/(A_{\mu})(C_{\nu})$

A_v = Area of Compound

A_{is} = Area of associated internal standard ernal standard Recalculated

%RSD

4.66

9.31

7.03 3.33 7.40 9.84

average %RSD =	RRF = $(H_{x})(C_{1S})'(H_{S})(C_{x})$ average RRF = sum of th %RSD = 100 * (S/X)	× <i>)</i> ·f the RRFs/	RRF = (Px)(Cis)/(Pis)(Cx) average RRF = sum of the RRFs/number of standards %RSD = 100 * (S/X)	A _x = Area or Compound C _x = Concentration of α S= Standard deviation o	A _x = Area or Compound C _x = Concentration of compound, S= Standard deviation of the RRFs,	nd, :RFs,	A_{is} – Area of associated in C_{is} = Concentration of inte X = Mean of the RRFs	sociated in ation of inte e RRFs
				Reported	Recalculated	Reported	Recalculated	Reported
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD
#	Standard ID Date	Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)	
-	ICAL	4/20/2010	1,4-Dioxane (IS1)	0.7058	0.7058	0.6724	0.6724	4.7
	MSS Y		Naphthalene (IS2)	1.0439	1.0439	1.0093	1.0094	9.3
			Fluorene (IS3)	1.3785	1.3785	1.3159	1.3159	7.0
			Hexachlorobenzene (IS4)	0.1957	0.1957	0.1957	0.1957	3.3
			Chrysene (IS5)	1.1000	1.0995	1.0921	1.0922	7.4
			Benzo(a)pyrene (IS6)	1.1590	1.1590	1.0622	1.0622	9.8

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00		1.1465	1.4250		1.2269	0.8463
10.00	0.7210	1.0828	1.3650	0.2057	1.1748	0.9826
20.00	0.6823	1.0751	1.4034	0.1974	1.1215	1.1326
50.00	0.7058	1.0439	1.3785	0.1957	1.1000	1.1590
80.00	0.6515	0.9974	1.3117	0.2016	1.0721	1.1514
120.00	0.6385	0.9445	1.2596	0.1922	1.0334	1.0904
160.00	0.6494	0.9053	1.1971	0.1873	1.0213	1.0825
200.00	0.6585	0.8794	1.1868	0.1898	0.9873	1.0531
×	0.6724	1.0094	1.3159	0.1957	1.0922	1.0622
S	0.0313	0.0939	0.0925	0.0065	0.0809	0.1046
_						

1239573

1617439

313873

276925

40/50

Area IS

Area cpd

ic IS/Cpd

716229

1234123

40/50 40/50

40/20

1238699

303072 1806969

1314740

1197319

1734579

40/50

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.

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page 1 of 1 2nd Reviewer. Reviewer:_

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

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

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound

Ais = Area of associated internal standard

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

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

Cis = Concentration of internal standard

Cx = Concentration of compound

		Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	WD
1	Y1968	04/26/10	1,4-Dioxane (IS1)	0.6724	0.6410	0.6410	4.7	4.7
			Naphthalene (IS2)	1.0093	0.9796	0.9796	2.9	2.9
			Fluorene (IS3)	1.3159	1.2955	1.2955	1.6	1.6
			Hexachlorobenzene (IS4)	0.1957	0.1951	0.1951	0.3	0.3
			Chrysene (IS5)	1.0921	1.0269	1.0269	6.0	6.0
			Benzo(a)pyrene (IS6)	1.0622	1.1116	1.1116	4.6	4.6
		:						

Compound (Reference IS)	S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	530018	413417
Naphthalene	(182)	40/80	3251231	1659515
Fluorene	(ESI)	40/80	2561260	988530
Hexachlorobenzene	(IS4)	40/80	673312	1725810
Chrysene	(185)	40/80	3615470	1760383
Benzo(a)pyrene	(981)	40/80	3761932	1692153

LDC#:_ SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof_1_
Reviewer:_	JV4_
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	loo	79.1	79	79	д
2-Fluorobiphenyl		75.1	75	70	1
Terphenyl-d14		83.6	83	13	
Phenol-d5	18	119.3	80	80	
2-Fluorophenol		117.9	79	79	
2,4,6-Tribromophenol		115.7	77	77	8
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

LDC# 03/26 TM SDG #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1_of__ Reviewer:_ 2nd Reviewer:

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

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

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Sample concentation

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

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples:

	Sp	ike	Sample	Spiked S	ample	Matrix Spike	Spike	Matrix Spik	Matrix Spike Duplicate	MS/MSD	gs
Compound	\$ 3	Added (VG/ke)	Concentration (Mg //g)	Concentration (Mg / kg)	tration (Ex.)	Percent Recovery	Recovery	Percent Recovery	ecovery	RPD	
	MS	0 MSD	0	MS	U MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2800	28.40		18040	1890	99	79	67	67	M	c
Pentachtorophenol	-	_									
Pyrene	1	_\		1920	2010	89	39	12	71	5	4
				-							

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#: 126 129 SDG #: See Corer

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

Reviewer: We

Page: lof L 2nd Reviewer:

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

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

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration SA = Spike added

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

08 87 18 Sh LCS/LCSD samples:

	S	ike	ďS	ke		S	Ċ	csn	I/SD1	CS/LCSD
Compound	Ad)	Added (VS AS)	Concentration (MS)	itration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	Ωι
	108	l CSD	SD I	l CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine						-				
4-Chloro-3-methylphenol										
Acenaphthene	2640	NA	09 ox	N.A	78	28				
Pentachlorophenol										
Pyrene	26.40	\	212		08	६४				
				•						

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

LDC#:_	731	126	tra
SDG #:	See	Con	• (

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u>lof_1</u>
Reviewer:_	No
2nd reviewer:_	h

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

Y	N	N/A_
X	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?

Concentration = $(A_x)(I_x)(V_t)(DF)(2.0)$ Example: $(A_{is})(RRF)(V_o)(V_i)(%S)$ Sample I.D. Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) Volume or weight of sample extract in milliliters (ml) or = grams (g). Volume of extract injected in microliters (ul) ٧, = Volume of the concentrated extract in microliters (ul) = ~ 1600 mg/kg Dilution Factor. Df Percent solids, applicable to soil and solid matrices only. %S

2.0	= Factor of 2 to accoun	t for GPC cleanup				
#	Sample ID	Compound		Reported Concentration ()	Calculated Concentration ()	Qualification
					······································	
		<u> </u>				
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-3

Sample Identification

SSAJ3-01-1BPC

SSAJ3-01-1BPCMS

SSAJ3-01-1BPCMSD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2301-3

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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 280-2301-3	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 280-2301-3

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2301-3	SSAJ3-01-1BPC	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 280-2301-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2301-3

No Sample Data Qualified in this SDG

Tronox Northqate Henderson

DC #: 23126V2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:280-2301-3	Stage 2B
_aboratory: Test America	_

	Date:	5/19/10
	Page:_	
	Reviewer:	3/4
2nd	Reviewer:	<u>ل_</u> _

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 /oa /o
II.	GC/MS Instrument performance check	A	
HI.	Initial calibration	A	3 RSD VY
IV.	Continuing calibration/ICV	A	COV / COV £ 25 }
V.	Blanks	A	2
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Á	
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	S M	FB = FB - 040 72010-RZD (286-2216-2)

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:

(2)

	201		 ,			
1	SSAJ3-01-1BPC	11	21		31	
2	SSAJ3-01-1BPCMS	12	22		32	
3	SSAJ3-01-1BPCMSD	13	23		33	
4	MB 280-110 G5/1-A	14	24		34	
5	,	15	25	41-79/	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**	W. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP, Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	ПТ.
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.

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LDC#:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

lof)	37/2	4
Page:	Reviewer:	2nd Reviewer:

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

Sampling date: 4

(MD)								
Ail	tion							
amples:	Sample Identification							
Associated Samples:	S							
ther:				ā				
(/ Rinsate / O		FB-04072010-RZD						
ര e) Field Blank	Blank ID	FB-0407	2,2					
oe: (circle one	puno		323					
Sampling date: 4/07/10 Field blank type: (circle one) Field Blank / Rinsate / Other.	Compound				-			CROL
Fie				<u></u>	<u> </u>	 <u> </u>	<u> </u>	

Blank units:

Sampling date:

Associated sample units:_

Associated Samples:

Sample Identification Field blank type: (circle one) Field Blank / Rinsate / Other Blank ID Compound 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 9, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-4

Sample Identification

SSAM6-01-1BPC SSAM6-01-2BPC SA60-3BPC SA60-4BPC SSAN6-04-1BPC SSAN6-04-1BPC FD

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 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2301-4	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 SSAN6-04-1BPC and SSAN6-04-1BPC_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 280-2301-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2301-4	SSAM6-01-1BPC SSAM6-01-2BPC SA60-3BPC SA60-4BPC SSAN6-04-1BPC SSAN6-04-1BPC_FD	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2301-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2301-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23126W2a Stage 2B 280-2301-4 SDG #: Laboratory: Test America

	Date:	5/a/1
	Page:_	<u>l</u> ofl
	Reviewer:	JV 4
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 /o 9 /ro
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	? RSD r
IV.	Continuing calibration/ICV	A	ca/10 = 252
V.	Blanks	A	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	A	Client Spec SSAJ3-01-18PC
VIII.	Laboratory control samples	A	ιcs '
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	Á	
XVI.	Field duplicates	NΦ	D = 5,6
XVII.	Field blanks	SNFAND	FB = 31 EB = 32, 32, 34 35

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:

Coil

	2011				
1	SSAM6-01-1BPC	11	21	<i>FB</i> 31	FB- 04072010-RZC(280-228
2	SSAM6-01-2BPC	12	22	号) 32	ER-04142010-RTG1-RZE (200-104)
3	SA60-3BPC	13	23	₽3> 33	EB-0414 2016- RIGZ- RZE
4	SA60-4BPC	14	24	13.3 34	EB-04/22019_8792-12C (280-235
5	SSAN6-04-1BPC	15	25	EB4 35	B-04172010 RZC (280-2383)
6	SSAN6-04-1BPC_FD b	16	26	36	
7	MB 280-11065/1-A	17	27	37	
8		18	28	38	
9	-in-	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**	II. Benzo(a)pyrene艹
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenoi**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
G. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)peryiene
E. 1,4-Dichlorobenzene⁺*	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	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	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**	ົກກາ
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)กินoranthene	WWW.

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

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 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-1

Sample Identification

SA156-3BPC**

SA156-5BPC**

SA156-7BPC**

SA156-9BPC**

SA156-3BPC FD

SA156-5BPCMS

SA156-5BPCMSD

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Sample EB-04122010-RIG1-RZB (from SDG 2802352-2) 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-04122010-RIG1-RZB	4/12/10	Bis(2-ethylhexyl)phthalate	2.3 ug/L	All samples in SDG 280-2352-1

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

Sample FB-04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples		
FB-04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-2352-1		

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. Although the MS/MSD percent recoveries (%R) and relative percent differences (RPD) were not within QC limits for several compounds, the MS, MSD, or LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2352-1	All compounds reported below the PQL.	J (all detects)	Α

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 4review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SA156-3BPC** and SA156-3BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)					
Compound	SA156-3BPC** SA156-3BPC_FD		RPD (Limits)	Difference (Limits)	Flags	A or P	
Bis(2-ethylhexyl)phthalate	350U	94		256 (≤350)	-		

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2352-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2352-1	SA156-3BPC** SA156-5BPC** SA156-7BPC** SA156-9BPC** SA156-3BPC_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 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 23126Y2a VALIDATION COMPLETENESS WORKSHEET Stage 2B/4 SDG #: 280-2352-1 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	Α	Sampling dates: 4 /12 /10
II.	GC/MS Instrument performance check	Α	
111.	Initial calibration	A	2 RSD 12
IV.	Continuing calibration/ICV	A	ca/a = 252
V.	Blanks	Á	
VI.	Surrogate spikes	_A	
VII.	Matrix spike/Matrix spike duplicates	SW)	
VIII.	Laboratory control samples	Á	LCS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	Α	
XI.	Target compound identification	MA	
XII.	Compound quantitation/CRQLs	МÅ	
XIII.	Tentatively identified compounds (TICs)	Цц	
XIV.	System performance	MA	
XV.	Overall assessment of data	Á	
XVI.	Field duplicates	SW	b = 1,5
XVII.	Field blanks	≤M	#B = FB 04 06 2010 - RZB (trom 280-2131-2)

EB = EB04122019-RESP (frm 280-2352->)
etected D = Duplicate 1-R28 (frm 280-2352->)

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

TB = Trip blank

EB = Equipment blank

Validated Samples: Soil

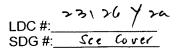
9	* usel 18 301	1				
1	SA156-3BPC ** 0	11	MB 280-10974/1- X	21	31	1
2 +	SA156-5BPC * *	12		22	32	2
3	SA156-7BPC * *	13		23	33	3
4	SA156-9BPC * *	14		24	34	1
† 5	SA156-3BPC_FD 9	15		25	35	5
6	SA156-5BPCMS	16		26	36	3
7	SA156-5BPCMSD	17		27	37	7
8		18		28	38	3
9		19	**************************************	29	39)
10		20		30	40	

VALIDATION FINDINGS CHECKLIST

Page: ___ of _2 Reviewer: _____ 2nd Reviewer: _____

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	163	140	IVA	Tridings comments
All technical holding times were met.				
Cooler temperature criteria was met.				
II. GC/MS instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
III. Initial calibration		ı	ı	
Did the laboratory perform a 5 point calibration prior to sample analysis?	/	ļ		
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	/			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	/			
IV. Continuing calibration				EAST STATE OF THE
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?				
V. Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?				
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates	1	ı	1	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
Vill. Laboratory control samples				
Was an LCS analyzed for this SDG?		<u>Ľ</u>		



VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 3/U 2nd Reviewer: ___

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internal standards			1	
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/			
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			_	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance				
System performance was found to be acceptable.				
XV. Overall assessment of data		1	ı	
Overall assessment of data was found to be acceptable.				300
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.	/			
XVII. Field blanks				Mary and the state of the state
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.				<u> </u>

VALIDATION FINDINGS WORKSHEET

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

			The state of the s	
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-Methyiphenoi	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J, N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichiorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TIT. 1,4. Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu. Octachlorostyrene
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.

LDC # 23/26 / 24 200 # SDG # SDG

VALIDATION FINDINGS WORKSHEET Field Blanks

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

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

= Associated Samples:

B/K X (y Sample Identification 8 ٩N cithel *Salts A EB (4/4) BK 10 FB (9/6) Blank ID 2.7 托 Compound CROL

Associated sample units: Blank units:

Sampling date:

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

Associated Samples:

The second secon						
	tion					:
	Sample Identification					
50,5000	S					
						₽.
110110						320 - AZB
, , , , , , , , , , , , , , , , , , , ,						FB = FB 04 06 20 10-
o) : : : : : : : : : : :	Blank ID					.8
iona anama alban (amana ama) i iona anama inama	Compound				CRQL	i.

5x Phthalates 2x All others

EB = EBO4122010 - RZB RIG1- RZB

LDC #: 23 124 / 29 SDG #: Ser

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

ot O Page:__ Reviewer. 2nd Reviewer:

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

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

Were 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 A Z Z

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?

		3															
Qualifications	No gual	leither MS ASD	or 105 n														
Associated Samples	~																
RPD (Limits)	2 11 mits)		()	()	()	()	()	()	()	()	()	()	()	()	()	()	(
MSD %R (Limits)	nds ontside	for of R ward "RADD"	(,)	()	()	()	()	()	()	()	()	()	()	()	()	()	,
MS %R (Limits)	several compani	for of R some	()	()	()	(()	()	()	()	()	()	()	()	()	()	
Compound	Seve																
DI OSW/SW	2/9	,)															
Date							:										
*																	

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Ą.	Phenoi	78-90%	< 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%	츳	KK. 2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
اح	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%	77.	Pyrene	35-142%	< 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

LDC #: 23/26 y ra SDG #: Sa Com

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page:	<u>of</u>
Reviewer:	NZ
2nd reviewer:	10

METHOD: GC/MS BNA (EPA SW 846 Method 82	270C)		
N N/A Were field duplicate pairs identifie Were target compounds identifie	ied in this SDG?		
N N/A Were target compounds identifie			
	Concentratio		
Compound		5	RPD
FEE	350 U	94	256 ± 350 Þ
·			
	<u> </u>		
ļ	Concentratio	p(
Compound	<u> </u>		RPD
	ļ		
ļ	Concentration	ın ()	
Compound	! !		RPD
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	Concentratio	on (
Compound	i		RPD
	1		
	· · · · · · · · · · · · · · · · · · ·		

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

of 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:

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

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

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

S= Standard deviation of the RRFs,

X = Mean of the RRFs

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

				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)		
L	ICAL	3/18/2010	3/18/2010 1,4-Dioxane (IS1)	0.5882	0.5882	0.5862	0.5862	6.9	6.88
	MSS D		Naphthalene (IS2)	1.1221	1.1221	1.1134	1.1134	3.0	3.01
			Fluorene (IS3)	1.3445	1.3445	1.3224	1.3225	5.0	5.04
			Hexachlorobenzene (IS4)	0.2412	0.2412	0.2488	0.2487	8.9	8.87
			Chrysene (IS5)	1.0697	1.0697	1.0065	1.0065	8.2	8.17
			Benzo(a)pyrene (IS6)	1.1044	1.1044	1.0885	1.0885	6.7	69.9

Area IS	397528	1402196	957696	1602894	1864283	1790944
Area cpd	292285	1966829	1609531	483347	2492854	2472315
nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.6542	1.1382	1.2049		1.0249	0.9762
10.00	0.6168	1.1444	1.2482	0.2132	1.0017	1.0038
20.00	0.5587	1.1266	1.2972	0.2367	1.0484	1.0453
50.00	0.5882	1.1221	1.3445	0.2412	1.0697	1.1044
80.00	0.5191	1.0774	1.3440	0.2492	1.0741	1.1019
120.00	0.5793	1.1406	1.3805	0.2535	1.0559	1.1505
160.00	0.5706	1.1068	1.3878	0.2641	0.9457	1.1705
200.00	0.6029	1.0507	1.3725	0.2833	0.8319	1.1554
×	0.5862	1.1134	1.3225	0.2487	1.0065	1.0885
S	0.0403	0.0335	0.0666	0.0221	0.0822	0.0728

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

LDC # 79/26 / 26 SDG # See Cover

VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page of A

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

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

Where:

ave. RRF = initial calibration average RRF

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

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

RRF = continuing calibration RRF

Ax = Area of compound

Ais = Area of associated internal standard

Cx = Concentration of compound Cis = Concentration of internal standard

Recalculated 10.6 0.2 3.1 0.1 2.2 Reported ۵% 10.6 0.2 1.0 0.1 2.2 3.1 Recalculated (CC RRF) 1.1128 0.5805 1.3203 0.2542 1.0377 1.2035 (CC RRF) Reported 0.5805 1.1128 1.3203 0.2542 1.2035 1.0377 Average RRF (Initial RRF) 1.1134 0.5862 1.3224 0.2488 1.0065 1.0885 (181) (182) (183) (184) (185)(186) Compound (Reference IS) Hexachlorobenzene Benzo(a)pyrene Naphthalene 1,4-Dioxane Chrysene Fluorene Calibration 04/16/10 Date Standard ID D3996 #

Compound (Reference IS)	IS)	Concentration	Area Cpd	Area IS
* 10. 00.00		(IS/Cpd)		
1,4-Dioxane	(181)	40/80	453857	390903
Naphthalene	(182)	40/80	3177574	1427715
Fluorene	(183)	40/80	2697204	1021471
Hexachlorobenzene	(184)	40/80	868351	1708342
Chrysene	(185)	40/80	4195266	2021491
Benzo(a)pyrene	(981)	40/80	4035191	1676408

LDC #: 23 126 7 29 SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: lof 1
Reviewer: NY
2nd reviewer: L

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: # 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	150	67.86	68	68	O
2-Fluorobiphenyl		70.77	71	71	1
Terphenyl-d14		89.84	90	90	
Phenol-d5	150	102.2	71	71	
2-Fluorophenol		106.5	71	71	
2,4,6-Tribromophenol	V	111.69	74	74	
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

SDG #: See Care

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET



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

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

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

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

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

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples:

	Sp	ike	Sample	Spiked Sample	Sample	Matrix Spike	Spike	Matrix Spike Duplicate	Duplicate	USW/SW	SD
Compound	Added (%)	ded (C_)	Concentration (Mc /(C)	Concentration	tration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
	MS	MSD	0	MS	O _{MSD}	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2770	2962	9	1950	2861	22	70	48	48	4	36
Pentachlorophenol											
Pyrene	2772	2962	>	2500	ac61	90	90	99	99	72	26

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#: 11/4 / 74 SDG #: See Cover

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

Page: Lof 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)

780-10974 A-A LCS/LCSD samples: Lt5

	S	oike	S	ike)1	CS	31	CSD	103/	I CS/I CSD
Compound	A W	Added (190 /k.)	Concei (Kc	Concentration (145 //ح)	Percent Recovery	ecovery	Percent Recovery	Recovery	В	RPD
	SUL	0 I CSD	1.05	U LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine								-		
4-Chloro-3-methylphenol										
Acenaphthene	2450	マス	1450	NA	79	79.5				
Pentachlorophenol										
Pyrene	0242	\	0542		96	de				
				>						
					-					
1				Particular Control of the Control of	A					

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 79 124 7 76 SDG #: Sce Corr

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lot1_
Reviewer:	JV6
2nd reviewer:	·

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

Y N N/A Y N N/A

=

%S

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Fyample: Concentration = $(A_{\bullet})(I_{\bullet})(V_{\bullet})(DF)(2.0)$ $(A_{is})(RRF)(V_o)(V_i)(\%S)$ Area of the characteristic ion (EICP) for the compound Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) Volume or weight of sample extract in milliliters (ml) or = grams (g). Volume of extract injected in microliters (ul) ٧, = Volume of the concentrated extract in microliters (ul) = Dilution Factor. Df =

Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:
Sample I.D. # Y, EFT
$ \begin{array}{c c} \text{Conc.} = (12285)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)$
= 2.43~ (1.0ml) (1000)
(30,087 (0.911)

#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
		=	88.99		
		<u>z</u>	89 ug/fg		
		· · · · · · · · · · · · · · · · · · ·	89 49/4		
				C'allan	

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): 280-2352-4

Sample Identification

SSAM7-04-1BPC

SSAM7-03-1BPC

SSAJ3-02-1BPC

SSAJ3-02-1BPC FD

SSAH3-01-1BPC

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 (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.

Samples EB-04122010-RIG3-RZD and EB-04122010-RIG2-RZC (both from SDG 280-2352-2) 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-04122010-RIG3-RZD	4/12/10	Bis(2-ethylhexyl)phthalate	2.3 u g/L	SSAJ3-02-1BPC SSAJ3-02-1BPC_FD SSAH3-01-1BPC

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

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	SSAJ3-02-1BPC SSAJ3-02-1BPC_FD SSAH3-01-1BPC

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. 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 280-2352-4	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAJ3-02-1BPC and SSAJ3-02-1BPC_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 280-2352-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2352-4	SSAM7-04-1BPC SSAM7-03-1BPC SSAJ3-02-1BPC SSAJ3-02-1BPC_FD SSAH3-01-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2352-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2352-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2352-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:_	23126Z2a	VALIDATION COMPLETENESS WORKSHEE
SDG #:	280-2352-4	Stage 2B
Laborato	ny: Test America	-

Date:	5/19/1
Page:_	lof_1
Reviewer:	W
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 /2 /10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	7, RSD YY
IV.	Continuing calibration/ICV	A	Ca/a = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	SSAJ3-01-1BPC
VIII.	Laboratory control samples	A	иs
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	ND	D= 3,4
XVII.	Field blanks	SW	FB = 31, 37 FB = 33, 34

Note:

A = Acceptable

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:

1	SSAM7-04-1BPC	11	21	15B FB-04072010-R2p (280-
2	SSAM7-03-1BPC	12	22	FB-04072010-RZD (280- FB2 32 FB-04072010-RZC (280-
3	SSAJ3-02-1BPC	13	23	EB1 EB-04122010-RIG3-RZ
1	SSAJ3-02-1BPC_FD	14	24	EB - 04122010-RIG2-R:
5	SSAH3-01-1BPC	15	25	35
<u> </u>		16	26	36 (280_2352_2
,		17	27	37
3		18	28	38
)		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-butyiphthalate	MMM. Bis(2-Chlorolsopropyl)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-Nitrosodimethyiamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methyinaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachiorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-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-ethylhexy!)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate™	חחח
N. 2-Nitrophenol™	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)กินอกากthene	WWW.

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

26 7 29	\ C \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
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LDC #	SDG#

VALIDATION FINDINGS WORKSHEET Field Blanks

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ETHOD: GC/MS BNA (EPA SW 846 Meth	

Were field blanks identified in this SDG?

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

					-				
7	3-5 (MD)								
•	5-5	tion							
	amples:	Sample Identification							
	Associated Samples:	Ö						-	
	ther:		<u>,</u>	,				;	
//a dillis.	د / Rinsate / C		(4/2) EBI(4/2)	2,3					
0 4 /07	e) Field Blank	Blank ID	FB 1 (467)	2,2			-		
Sampling date: 4/12/10 4/67/10	d blank type: (circle one	Compound		EFE 2,2		•			7.
San	Fie	Щ							CRQL

ample units:	
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lank units:	

Sampling date: Field Blank / Rinsate / Other: Field blank / Rinsate / Other:

Associated Samples:

_		 	 	 	
		And the latest the lat			
	ion				
	Sample Identification				
	Š				
	Blank ID				
	puno				
	Compound				CROL

⁵x Phthalates 2x All others

Tronox PCS Data Validation Reports LDC# 23126

Chlorinated Pesticides



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 20, 2010

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-2

Sample Identification

FB-04072010-RZD

Introduction

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

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

V. Blanks

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

Sample FB-04072010-RZD 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.

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. 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 280-2216-2	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2216-2

SDG Sample Compound		Flag	A or P	Reason (Code)	
280-2216-2	FB-04072010-RZD	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2216-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2216-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET ae 2B

LDC #: 23126G3a	VALIDATION COMPLE
SDG #: 280-2216-2	Stag
Laboratory: Tast America	•

Page: __of 2nd Reviewer:

Laboratory: Test America

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: 4/7/16
11.	GC/ECD Instrument Performance Check	A	
HI.	Initial calibration	A	۲۲
IV.	Continuing calibration/ICV	SW A	IC/(CCV = 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Specified
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	FB=1
XV.	Field blanks	pD	F6=1

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	FB-04072010-RZD (人	11	21	3	1 280-10593-BLK
2		12	22	3	32
3		13	23	3	33
4		14	24	3	34
5		15	25	3	35
6		16	26	3	36
7		17	27	3	37
8		18	28	3	88
9		19	29	3	9
10		20	30	4	0

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 20, 2010

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-2

Sample Identification

FB-04072010-RZC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

A curve fit, based on the initial calibration, was established for quantitation. 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.

Sample FB-04072010-RZC 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.

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. 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 280-2280-2	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2280-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2280-2	FB-04072010-RZC	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

	Date:	5-18	-10
	Page:_		
	eviewer:	PS	
2nd Re	eviewer:		

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: 4/8/10
11.	GC/ECD Instrument Performance Check	A	
ill.	Initial calibration	A	r ² ,
IV.	Continuing calibration/ICV	SW	ICV/CCV 620 %
V.	Blanks	A	l l
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client specified
VIII.	Laboratory control samples	A	Les/D
IX.	Regional quality assurance and quality control	N	·
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	MD	FB2L

Note: A = Acceptable

LDC #: 23126O3a

SDG #: 280-2280-2 Laboratory: Test America

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

1	FB-04072010-RZC W	11	21	31	280-10593-BLK
2		12	22	32	
3		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	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

May 20, 2010

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-1

Sample Identification

SSAI2-02-1BPC

SSAI2-02-5BPC

SSAI2-02-1BPCMS

SSAI2-02-1BPCMSD

SSAI2-02-5BPCMS

SSAI2-02-5BPCMSD

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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.

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. 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. Surrogate recoveries (%R) were not within QC limits. 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

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 280-2301-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2301-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2301-1	SSAI2-02-1BPC SSAI2-02-5BPC	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2301-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2301-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23126U3a Stage 2B SDG #: 280-2301-1 Laboratory: Test America

Date:	5-18-10
Page:_	_of
Reviewer:	H
2nd Reviewer:_	' Q

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 9 16
11.	GC/ECD Instrument Performance Check	A	• •
III.	Initial calibration	A-	12, 0/085D IEV/CCV = 2090
IV.	Continuing calibration/ICV	5W	Ter/CCV 5 20 90
V.	Blanks	A	(
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	Chan SDG4
XV.	Field blanks	ND	FB=FB-04072010-RZD (280-2216-)

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

Valid	ated Samples:	1			
1	SSAI2-02-1BPC	11	21	31	280-10837-BLK
1 2 3 4	SSAI2-02-5BPC	12	22	32	
3	SSAI2-02-1BPCMS	13	23	33	
4	SSAI2-02-1BPCMSD	14	24	34	
5	SSAI2-02-5BPCMS	15	25	35	
6	SSAI2-02-5BPCMSD	16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

VALIDATION FINDINGS WORKSHEET

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

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	J.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	χ. Υ.
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. Araclar-1232	FF. Hexachlorobenzene	NN.

	:	
Notes:		

VALIDATION FINDINDS WORNSHEET Surrogate Recovery

rage: or / Reviewer:__ 2nd Reviewer.

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

SDG#

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

Note: Note: Note: Surrogates spiked into all samples and blanks?

Note: Note:

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	imits)	Qualifications
		(x2a57)	4	A	0	(59-115-)	no avel , dit = 100
			7	8	00588	(63-124)	1 1
			Ď	Ą	0	(511-65)	
\top			7	Ð	20400	(h1-E9)	
		2 (250x)	A	A	0	(59-115)	
П			7	9	4290	(hr-29)	
			В	А	0	$(59-11)^{-1}$	
			A	В	0,878	(\$2-10 4)	
						(,)	
						(
						()	
						()	
						()	
						(
						()	
						()	
						()	
						(
						(
						(
						()	
						()	
	Designation		Surrogate Compound	Recovery O	Recovery QC Limits (Soil)	Recovery QC	Recovery QC Limits (Water) Comments
	∢	Tet	n-xylene				
	æ	Decachlorobiphenyl	iphenyl				

17) # 1/140 7 SDG #SEECONE

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

2nd Reviewer.

Page: Reviewer

> HPLC METHOD: GC_

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N/A N N/A 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	No 900 , d:12/0X	1			10 Auc 1112/11																				
Associated Samples	J																								
RPD (Limits)	()	1 (252x)	()	()	1 2800X()	()	()	()	()	()	()	()	()		()			()	()	()	((()	()	
MSD %R (Limits)	2040 (50-120)	y 4		()	5 high dil B		()	()	()	()	()	()	()	()	()	()	()		()	()	()	()	()	()	
MS %R (Limits)	(6600 (50-130)	α	- 1	()	NC (duly) to	()	()	()	()	()	()		()	()	()	()	()		()	()	()	()		()	
Compound	77				n																				
MS/MSD ID	5/6	•			5/4																				
#															-								1		

Tronox PCS Data Validation Reports LDC# 23126

Metals



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-1

Sample Identification

RSAQ3-3BPC FD

RSAQ3-3BPC

RSAQ3-5BPC

SSA06-02-1BPC FD

RSAP6-1BPC FD

RSAP6-1BPC

RSAP6-5BPC

SSA06-02-1BPC

SSA06-02-5BPC

SSA06-02-9BPC

SSA06-02-10BPC

SA51-1BPC

SA51-5BPC

SA51-5BPCFD

RSAK7-3BPC

RSAK7-5BPC

SSA06-02-5BPCMS

SSA06-02-5BPCMSD

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 Methods 6020 for Arsenic, Lead, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples FB-04072010-RZC (from SDG 280-2280-2), FB-04072010-RZD (from SDG 280-2216-2), and FB04062010-RZB (from SDG 280-2131-1) were identified as field blanks. No metal contaminants were found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2131-1	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

Samples RSAQ3-3BPC_FD and RSAQ3-3BPC, samples SSA06-02-1BPC_FD and SSA06-02-1BPC, samples RSAP6-1BPC_FD and RSAP6-1BPC, samples SA51-5BPC and SA51-5BPCFD, and samples RSAK7-3BPC and RSAK7-3BPC_FD (from SDG 280-2131-2) were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentration	on (mg/Kg)	RPD	Difference		
Analyte	RSAQ3-3BPC_FD	RSAQ3-3BPC	(Limits)	(Limits)	Flags	A or P
Arsenic	3.4	3.2	6 (≤50)	-	-	-

	Concentration	on (mg/Kg)	RPD	Difference		
Analyte	SSA06-02-1BPC_FD	SSA06-02-1BPC	(Limits)	(Limits)	Flags	A or P
Arsenic	4.1	7.3	56 (≤50)	-	J (all detects)	А

	Concentration	on (mg/Kg)				
Analyte	SSA06-02-1BPC_FD	SSA06-02-1BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Lead	11	15	31 (≤50)	-	-	-
Manganese	850	1300	42 (≤50)	-	-	-

	Concentrati	on (mg/Kg)		D.#		
Analyte	RSAP6-1BPC_FD	RSAP6-1BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	1100	1100	0 (≤50)	-	-	-

	Concentrat	ion (mg/Kg)				
Analyte	SA51-5BPC	SA51-5BPCFD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.4	3.3	3 (≤50)	-	-	-

	Concentrati	on (mg/Kg)				
Analyte	RSAK7-3BPC_FD	RSAK7-3BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	5.8	6.2	7 (≤50)	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2131-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-1	RSAQ3-3BPC_FD RSAQ3-3BPC RSAQ3-5BPC SSA06-02-1BPC_FD RSAP6-1BPC_FD RSAP6-1BPC RSAP6-5BPC SSA06-02-1BPC SSA06-02-5BPC SSA06-02-9BPC SSA06-02-10BPC SA51-1BPC SA51-5BPC SA51-5BPC SA51-5BPC RSAK7-3BPC RSAK7-5BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-2131-1	SSA06-02-1BPC_FD SSA06-02-1BPC	Arsenic	J (all detects)	А	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2131-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2131-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ORKSHEET

LDC #:	23126A4	_ VALIDATION COMPLETENESS W
SDG #:	280-2131-1	Stage 2B
Laborator	v. Test America	•

Reviewer: 2nd Reviewer:

METHOD: As, Pb, Mn (EPA SW 846 Method 6020)

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

	Validation Area	<u> </u>	Comments
<u>l.</u>	Technical holding times	A	Sampling dates: 4/6/10
П.	ICP/MS Tune	LA	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	mS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	1
Χ.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2),(4,8),(5,6),(13,14), seet
XV	Field Blanks	ND	FB=FB-04072010-RZC, FB=0407200-RZD, C506# Z802280-2) (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

FB04062010-RZB

EB = Equipment blank

Validated Samples:

1	RSAQ3-3BPC_FD	11	SSA06-02-10BPC	21	PB5	31	
2	RSAQ3-3BPC	12	SA51-1BPC	22		32	
3	RSAQ3-5BPC	13	SA51-5BPC	23		33	
4	SSA06-02-1BPC_FD	14	SA51-5BPCFD	24		34	
5	RSAP6-1BPC_FD	15	RSAK7-3BPC	25		35	
6	RSAP6-1BPC	16	RSAK7-5BPC	26		36	
7	RSAP6-5BPC	17	SSA06-02-5BPCMS	27		37	
8	SSA06-02-1BPC	18	SSA06-02-5BPCMSD	28		38	
9	SSA06-02-5BPC	19		29		39	
10	SSA06-02-9BPC	20	·	30		40	• • • • • • • • • • • • • • • • • • • •

Notes:_	FD:	(15)	15AK7-	<u> 36PC _</u>	.FO (S	06A 28	0-2131	2) [
								7	

LDC#: 25166717 SDG#: 280-2131-1

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_ Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3,5-7,12	16	Al, Sb, (As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
4.8-11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg (M), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
-1) () -1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
0.176		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Fb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, Al, Sb, As, 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(11)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,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	1.1.00	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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 - 3101		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, 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
CP		Al, Sb, As, 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,(A), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe,(Pb) Mg,(Mn,)Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
GEAA		Al Sh. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN

LDC#: 23126A4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	\mathcal{L}_{lo}
Reviewer:	C2
2nd Reviewer:_	

METHOD: Metals (EPA Method 6020/7000)

Were field duplicate pairs identified in this SDG?

YN NA
Were target analytes detected in the field duplicate pairs?

V:\FIELD DUPLICATES\FD_inorganic\23126A4.wpd

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	1	2	RPD	Difference	Limits	(Parent Only)	
Arsenic	3.4	3.2	6				

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	4	8	RPD	Difference	Limits	(Parent Only)
Arsenic	4.1	7.3	56			Jdet/A (fd)
Lead	11	15	31			
Manganese	850	1300	42			

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	5	6	RPD	Difference	Limits	(Parent Only)
Arsenic	1100	1100	0			

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	13	14	RPD	Difference	Limits	(Parent Only)
Arsenic	3.4	3.3	3			

LDC_23126A6_ SDG#: See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page of Reviewer: 22nd Reviewer: 22n

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

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)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Analyte	RSAK7-3BPC_FD (SDG#: 280-2131-2)	15	RPD	Difference	Limits	(Parent Only)
Arsenic	5.8	6.2	7			

V:\FIELD DUPLICATES\FD_inorganic\23126A6a.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

May 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-6

Sample Identification

RSAP6-7BPC RSAP6-9BPC

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 Methods 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2131-6	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2131-6

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-6	RSAP6-7BPC RSAP6-9BPC	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 280-2131-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2131-6

No Sample Data Qualified in this SDG

Trongy Northgate Henderson HEET

LDC #:23126C4	VALIDATION COMPLETENESS WORKS
SDG #: 280-2131-6	Stage 2B
Laboratory: Test America	<u> </u>

Page: \ of \ \ Reviewer: \ CC 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.

		<u> </u>					
	Validation Area		Comments				
l.	Technical holding times	A	Sampling dates: 4/6/10				
II.	ICP/MS Tune	A					
III.	Calibration	A .					
IV.	Blanks	A					
V.	ICP Interference Check Sample (ICS) Analysis	A.	,				
VI.	Matrix Spike Analysis	AJA-	Client specifieder ms/0 (506/280-22167)				
VII.	Duplicate Sample Analysis	\mathcal{N}	,				
VIII.	Laboratory Control Samples (LCS)	A	LCS				
IX.	Internal Standard (ICP-MS)	H.					
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Not utilized				
XI.	ICP Serial Dilution	a-AA	161 presormedor (506 pr 280-2216-7)				
XII.	Sample Result Verification	N ·					
XIII.	Overall Assessment of Data	A					
XIV.	Field Duplicates	\sim					
XV	Field Blanks	ND	FB=FB04072010-BZC(506*250-2250.2)				

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	RSAP6-7BPC	11	୧୫୨	21	31	
2	RSAP6-9BPC	12		22	32	
3		13		23	33	
4		14		24	34	·
5		15		25	35	
6		16		26	 36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

May 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-9

Sample Identification

SSA06-02-3BPC SA51-3BPC SSA06-02-3BPCMS SSA06-02-3BPCMSD

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 Methods 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2131-9	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 280-2131-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-9	SSA06-02-3BPC SA51-3BPC	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 280-2131-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2131-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson SHEET

LDC #:	23126E4	VALIDATION COMPLETENESS WORK
SDG #:_	280-2131-9	_ Stage 2B
Laborato	ry: Test America	

	Date: 5-18-10
	Page: 1_of_1_
	Reviewer: CC
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: 4/6/10
11.	ICP/MS Tune	A	
- 111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	\mathcal{N}	, ,
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Monutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A,	
XIV.	Field Duplicates	$\mid \mathcal{N} \mid$	
XV	Field Blanks	ND	FB= FB-04072010- RZC
		L	FB= FB-04072010- RZC (SNGN 250-7280-Z)

Note:

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

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	SSA06-02-3BPC	11	985	21	31	
2	SA51-3BPC	12		22	32	
3	SSA06-02-3BPCMS	13		23	33	
4	SSA06-02-3BPCMSD	14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	 	 		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 7, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

SSAJ8-02-1BPC FD

SSAN7-01-1BPCMS

SSAN7-01-1BPCMSD

SSAJ8-02-5BPC

SSAJ8-02-1BPC

Sample Delivery Group (SDG): 280-2216-1

Sample Identification

SSAN7-01-1BPC

SSAN7-01-2BPC

SSAN7-01-5BPC

00/11/7 07 00/

SA137-3BPC

SA137-4BPC

SA137-5BPC

SA137-5BPC FD

SA39-3BPC

SA39-5BPC

SA130-3BPC

SA130-5BPC

SA130-5BPC FD

SA40-1BPC

SA40-5BPC

RSAR7-3BPC

SA84-3BPC

SA84-4BPC

SA84-5BPC

SA204-3BPC

SA204-5BPC

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, Lead, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- 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	0.0118 ug/L	SA137-3BPC SA137-4BPC SA137-5BPC SA137-5BPC_FD
ICB/CCB	Manganese	0.511 ug/L	SA137-4BPC SA137-5BPC SA137-5BPC_FD

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), FB-04072010-RZD (from SDG 280-2216-2), and FB04062010-RZB (from SDG 280-2131-1) 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	SSAN7-01-1BPC SSAN7-01-2BPC SSAN7-01-5BPC SA137-3BPC SA137-4BPC SA137-5BPC SA137-5BPC_FD

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2216-1	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA137-5BPC and SA137-5BPC_FD, samples SA130-5BPC and SA130-5BPC_FD, and samples SSAJ8-02-1BPC_FD and SSAJ8-02-1BPC were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)		555			
Analyte	SA137-5BPC	SA137-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	89	74	18 (≤50)	-	-	-
Cobalt	140	130	7 (≤50)	-	-	-
Manganese	6900	6100	12 (≤50)	-	-	-

	Concentration (mg/Kg)					
Analyte	SA130-5BPC	SA130-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	1600	1600	0 (≤50)	-	-	-
Manganese	64000	68000	6 (≤50)	-	-	-

	Concentration	on (mg/Kg)	DDD	D:#		
Analyte	SSAJ8-02-1BPC_FD SSAJ8-02-1BPC		RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.3 3.4		3 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2216-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-1	SSAN7-01-1BPC SSAN7-01-2BPC SSAN7-01-5BPC SSAN7-01-5BPC SA137-3BPC SA137-5BPC SA137-5BPC SA137-5BPC SA39-3BPC SA39-5BPC SA130-5BPC SA130-5BPC SA40-1BPC SA40-5BPC RSAR7-3BPC SA84-3BPC SA84-3BPC SA84-3BPC SA84-5BPC SA204-3BPC SA204-5BPC SA204-5BPC SSAJ8-02-1BPC_FD SSAJ8-02-1BPC	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 280-2216-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2216-1

No Sample Data Qualified in this SDG

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LDC #: 23126F4	VALIDATION COMPLETENESS WORKSHEET	Date: <u>5-18-1</u> 0
SDG #: 280-2216-1	_ Stage 2B	Page: <u> </u>
Laboratory: Test America	<u>-</u>	Page: <u> </u> of Reviewer:
		2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/7/10
II.	ICP/MS Tune	A	
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	\wedge	,
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	Noturiized
XI.	ICP Serial Dilution	Á	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(6,7), (11,12), (21,25) FB-CHO12010-RZD, FB-CHO12010-RZD, FBOHO62010 (280-2280-2) (280-2216-2) (280-213
XV	Field Blanks	SW FAS	FB-04072010-RZC, FB-04072010-RZD, FB04062010

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:

	<u> </u>						
1	SSAN7-01-1BPC	11	SA130-5BPC	21	SSAJ8-02-1BPC_FD	31	PBS
2	SSAN7-01-2BPC	12	SA130-5BPC_FD	22	SSAJ8-02-5BPC	32	PBS
3	SSAN7-01-5BPC	13	SA40-1BPC	23	SSAN7-01-1BPCMS	33	-
4	SA137-3BPC	14	SA40-5BPC	24	SSAN7-01-1BPCMSD	34	
5	SA137-4BPC	15	RSAR7-3BPC	25	SSAJ8-02-18PC	35	
6	SA137-5BPC	16	SA84-3BPC	26		36	
7	SA137-5BPC_FD	17	SA84-4BPC	27		37	
8	SA39-3BPC	18	SA84-5BPC	28		38	
9	SA39-5BPC	19	SA204-3BPC	29		39	
10	SA130-3BPC	20	SA204-5BPC	30		40	

Notes:		

SDG #: 280-2216-1

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: _`_ot__}

Reviewer: __CR__

2nd reviewer: _____

All circled elements are applicable to each sample.

Sample ID Matrix	Townet Analyte Lint (TAL)
1-7	Al, Sb, (As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, (Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
8,9	Al, Sb, As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
10-12	Al, Sb(As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg,(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
13-22,25	Al, Sb,(As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, 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: 23,24	Al, Sb,(A), Ba, Be, Cd, Ca, Cr, C), Cu, Fe, (Pb) Mg(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, 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

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) SDG #: See Cover LDC #: 23126F4

Sample Concentration units, unless otherwise noted:

Associated Samples:

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x

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	L e	 	Sample Concentration units, unless otherwise noted: mg/Kg	1,000	E a.	F
	Maximum ICB/CCB ^a (ug/L)	0.0118	a		Maximum ICB/CCB ^a (ug/L)	
	laximur CB/CCE (ug/L)	17	Wis.		laximui SB/CCE (ug/L)	0.511
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a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note:

LDC #: 23126F4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer.

Page: Reviewer.

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

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

Field Blank: (bf)

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

100x

1-7 Associated Samples: Sampling date: 4/8/10 Soikfactor applied 100 Field blank type: (circle one)(Field Blank)/ Rinsate / Other Sampling date: 4/8/10

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Sample Identification													
Sa													
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	No Qualifiers												
	Action Level												
Blank ID	RZC 80-2)	0.016											
Analyte	300000 - 1175774	Co											

LDC#:	23126F4
SDG#	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

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Page: <u></u> of	
Reviewer: <u>C</u>	
2nd Reviewer: 1	\sim

METHOD: Metals (EPA Method 6020/7000)

 YN NA
 Were field duplicate pairs identified in this SDG?

 YN NA
 Were target analytes detected in the field duplicate pairs?

 V:\FIELD DUPLICATES\FD_inorganic\23126F4.wpd

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	6	7	RPD	Difference	Limits	(Parent Only)
Arsenic	89	74	18			
Cobalt	140	130	7			
Manganese	6900	6100	12			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	11	12	RPD	Difference	Limits	(Parent Only)
Arsenic	1600	1600	0			
Manganese	64000	68000	6			

Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	21	25	RPD	Difference	Limits	(Parent Only)
Arsenic	3.3	3.4 3				

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/Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-2

Sample Identification

SA203-2BPC

SA203-2BPC FD

SA203-4BPC

SA203-6BPC

SA203-8BPC

FB-04072010-RZD

SA203-8BPCMS

SA203-8BPCMSD

Introduction

This data review covers 7 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
ICB/CCB	Cobalt	0.0110 ug/L	All water samples in SDG 280-2216-2

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
FB-04072010-RZD	Cobalt	0.012 ug/L	1.0U ug/L

Samples FB04062010-RZB (from SDG 280-2131-1) and FB-04072010-RZD 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-RZD	4/7/10	Cobalt Manganese	0.012 ug/L 1.3 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 280-2216-2	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA203-2BPC and SA203-2BPC_FD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)					
Analyte	SA203-2BPC	SA203-2BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	11	12	9 (≤50)	-	-	_

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2216-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-2	SA203-2BPC SA203-2BPC_FD SA203-4BPC SA203-6BPC SA203-8BPC FB-04072010-RZD	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 280-2216-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2216-2	FB-04072010-RZD	Cobalt	1.0U ug/L	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2216-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson WORKSHEET

LDC #: 23126G4	VALIDATION COMPLETENESS
SDG #: 280-2216-2	_ Stage 2B
Laboratory: Test America	

Reviewer:_ 2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
l	Technical holding times	A	Sampling dates: 4/7/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	H	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2)
XV	Field Blanks	SW	FB=6, FB0406Z010-RZB

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

soil/water

	9411			 		
1	SA203-2BPC 5	11_	21	PBS	31	
2	SA203-2BPC_FD	12	22	98n	32	
3	SA203-4BPC	13	23		33	
4	SA203-6BPC	14	24		34	
5	SA203-8BPC	15	25		35	
6	FB-04072010-RZD ₩	16	26		36	
7	SA203-8BPCMS 5	17	27		37	
8	SA203-8BPCMSD	18	28		38	
9		19	29		39	
10		20	30		40	

Notes:					

SDG#: SPECOEL

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Reviewer: C²
2nd reviewer: V

All circled elements are applicable to each sample.

Sample ID Matrix Target Analyte List (TAL) I - 5 S AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, 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, AI, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se,	
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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, Ph, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN	.,

Comments:_	Mercury by CVAA if performed	

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES	Soil preparation factor applied: NA	Associated Samples: All Water	
LDC #: <u>23126G4</u> SDG #: See Cover	METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)	Sample Concentration units, unless otherwise noted: ug/L	

Page: of Reviewer: C/Z-

Reason Code: bl

	ω	0.012 / 1.0
	Action Limit	
	Maximum ICB/CCB* (ug/L)	0.0110
000000	Maximum PB ^a (ug/L)	
	Maximum Maximum Maximum PB³ ICB/CCB³ (mg/Kg) (ug/L)	
000	Analyte	ပိ

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

LDC #: 23126G4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: _of _\ Reviewer: _Q\

2nd Reviewer:_

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

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

Were target analytes detected in the field blanks?

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

Associated Samples: No Associated Samples 100x Field blank type: (circle one) Field Blank / Rinsate / Other. Soil factor applied Sampling date: 4/7/10

Sample Identification Action Level د. Blank ID 0.012 1.3 ဖ Analyte ပ္ပ Σ

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

LDC#:_	23126G4
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Reviewer: 2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

Were field duplicate pairs identified in this SDG?

YN NA
Were target analytes detected in the field duplicate pairs?

V:\FIELD DUPLICATES\FD_inorganic\23126G4.wpd

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	1	2	RPD	Difference	Limits	(Parent Only)	
Arsenic	11	12	9				

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 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-7

Sample Identification

SA137-6BPC

SA137-8BPC

SA137-10BPC

SA130-6BPC

SA130-8BPC

SA39-6BPC

SA39-8BPC

RSAR7-4BPC

SA84-6BPC

SA84-8BPC

SA204-4BPC

SA137-6BPCMS

SA137-6BPCMSD

Introduction

This data review covers 13 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 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).
- The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

Sample FB-04072010-RZC (from SDG 280-2280-2) and sample FB04062010-RZB (from SDG 280-2131-1) were identified as field blanks. No arsenic 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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2216-7	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2216-7

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-7	SA137-6BPC SA137-8BPC SA137-10BPC SA130-6BPC SA130-8BPC SA39-6BPC SA39-8BPC RSAR7-4BPC SA84-6BPC SA84-6BPC SA204-4BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2216-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2216-7

No Sample Data Qualified in this SDG

Tronox Northgate Henderson KSHEET

LDC #: 23126K4	VALIDATION COMPLETENESS WOR
SDG #: 280-2216-7	Stage 2B
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
١.	Technical holding times	A	Sampling dates: 4/7/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/0
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	ILCS
IX.	Internal Standard (ICP-MS)	0	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	PB = FB-04072010-RZC, FB-04062010-RZB (280-2280-2) (280-2131-1)
Viote:	Li.	o compound	(280-7280-2) (280-2131-1)

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

1	SA137-6BPC	11	SA204-4BPC	21	885	31	
2	SA137-8BPC	12	SA137-6BPCMS	22		32	
3	SA137-10BPC	13	SA137-6BPCMSD	23		33	
4	SA130-6BPC	14		24		34	
5	SA130-8BPC	15		25		35	
6	SA39-6BPC	16		26		36	
7	SA39-8BPC	17		27		37	
8	RSAR7-4BPC	18		28		38	
9	SA84-6BPC	19		29		39	
10	SA84-8BPC	20		30		40	

Notes:			

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 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2270-1

Sample Identification

SSAK8-01-1BPC SSAK8-01-1BPC_FD SSAK8-01-5BPC

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No arsenic was found in this blank.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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 280-2270-1	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAK8-01-1BPC and SSAK8-01-1BPC_FD were identified as field duplicates. No Arsenic were detected in any of the samples with the following exceptions:

	Concentra	ition (mg/Kg)	DDD	Difference		A or P	
Compound	SSAK8-01-1BPC	SSAK8-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags		
Arsenic	2.9	2.6	-	0.3 (≤0.62)	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2270-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2270-1	SSAK8-01-1BPC SSAK8-01-1BPC_FD SSAK8-01-5BPC	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 280-2270-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2270-1

No Sample Data Qualified in this SDG

Tronox Northqate Henderson T

LDC #:	23126L4	VALIDATION COMPLETENESS WORKSHEE
SDG #:	280-2270-1	Stage 2B
Laboratory	/: Test America	<u> </u>

Date 5-18-10	_
Page: _of_	
Reviewer: CR	
2nd Reviewer:	

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/7/10
II.	ICP/MS Tune	A	
Ш.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	A.
VI.	Matrix Spike Analysis	B&C	mos client specifical ms/0(506/280-280-2280
VII.	Duplicate Sample Analysis	AN	\$
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\sim	(506/250-2250-1)
XI.	ICP Serial Dilution	A	(500k250-2250-1)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2)
ΧV	Field Blanks	ND	FB=FB-04072010-RZD

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

R = Rinsate

ND = No compounds detected

FB = Field blank

(280-2216-2) D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples: SO\\

	<u></u>				
1	SSAK8-01-1BPC	11	865	21	31
2	SSAK8-01-1BPC_FD	12		22	32
3	SSAK8-01-5BPC	13		23	33
4		14		24	34
5		15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:			

LDC#:_	23126L4
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	of
Reviewer	
2nd Reviewer:	

METHOD: Metals (EPA Method 6020/7000)

NNA

Were field duplicate pairs identified in this SDG?

V:\FIELD DUPLICATES\FD_inorganic\23126L4.wpd

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	1	2	RPD	Difference	Limits	(Parent Only)
Arsenic	2.9	2.6		0.3	≤0.62	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-1

Sample Identification

SA188-3BPC
SA188-3BPC_FD
SA188-5BPC
SSA05-02-1BPC_FD
SSA05-02-5BPC
SSA05-03-1BPC_FD
SSA05-03-1BPC_FD
SSA05-03-5BPC
SSA04-02-1BPC
SSA04-02-1BPC
SSA06-04-1BPC
SSA06-04-1BPC
SSA06-04-1BPC
SSA06-04-5BPC
SSA06-1BPC

SA63-5BPC SA63-5BPC_FD SSAO6-05-1BPC SSAO6-05-5BPC SSAO6-05-5BPC FD SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC SSAO5-02-5BPCMS SSAO5-02-5BPCMSD SSAO6-04-5BPCMSD SSAO6-04-5BPCMSD SSAO6-05-1BPCMSD SSAO6-05-1BPCMSD SSAO7-01-5BPCMSD

Introduction

This data review covers 31 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.

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
ICB/CCB	Magnesium	1.65 ug/L	SSAO5-02-1BPC SSAO5-02-1BPC_FD
ICB/CCB	Magnesium	1.75 ug/L	SSAO5-02-5BPC
ІСВ/ССВ	Magnesium	2.42 ug/L	SSAO6-04-1 BPC SSAO6-04-1 BPC_FD SSAO6-04-5BPC
ІСВ/ССВ	Cobalt	0.0179 ug/L	SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC
ICB/CCB	Manganese	1.20 ug/L	SSAO6-05-5BPC SSAO6-05-5BPC_FD SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC
ICB/CCB	Manganese	0.930 ug/L	SSAO6-05-1BPC

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.127 mg/Kg	SSAO6-05-1BPC SSAO6-05-5BPC SSAO6-05-5BPC_FD SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC

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

Sample EB-04072010-RZC (from SDG 280-2383-1) was identified as an equipment blank. No arsenic or manganese was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04072010-RZC	4/8/10	Cobalt	0.093 ug/L	SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC
EB-04072010-RZC	4/8/10	Manganese	15 ug/L	SA188-3BPC SA188-3BPC_FD SA188-5BPC SSAO5-03-1BPC_FD SSAO5-03-1BPC_FD SSAO5-03-5BPC SSAO6-04-1BPC SSAO6-04-1BPC_FD SSAO6-04-5BPC SSAO6-05-1BPC SSAO6-05-5BPC_FD

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 metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 ug/L	SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2280-1	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

Samples SA188-3BPC and SA188-3BPC_FD, samples SSAO5-02-1BPC and SSAO5-02-1BPC_FD, samples SSAO5-03-1BPC and SSAO6-04-1BPC and SSAO6-04-1BPC_FD, samples SA63-5BPC and SA63-5BPC_FD, samples SSAO6-05-5BPC and SSAO6-05-5BPC_FD, and samples SSAO7-01-1BPC and SSAO7-01-1BPC_FD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra	ion (mg/Kg)	555	Ph. 144		
Analyte	SA188-3BPC	SA188-3BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Manganese	4300	3800	12 (≤50)	-	-	-

	Concentrat	ion (mg/Kg)		D.W.			
Analyte	SSA05-02-1BPC	SSAO5-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	6.8	8.2	19 (≤50)	-	-	-	
Magnesium	9500	11000	15 (≤50)	-	-	-	

	Concentrat	ion (mg/Kg)		Difformo		
Analyte	SSAO5-03-1BPC	SSAO5-03-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	4.6	4.4	4 (≤50)	-	-	-
Manganese	350	470	29 (≤50)	-	-	-

	Concentra	tion (mg/Kg)	555		:	
Analyte	SSAO6-04-1BPC	SSAO6-04-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	1.2	1.5	-	0.3 (≤0.65)	-	-
Manganese	220	260	17 (≤50)	-	-	•
Magnesium	5300	7700	37 (≤50)	-	-	-

	Concentration (mg/Kg)		200			
Analyte	SA63-5BPC	SA63-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	7.5	7.2	4 (≤50)	-	-	_

	Concentration (mg/Kg)					
Analyte	SSAO6-05-5BPC	SSAO6-05-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	7.0	8.1	15 (≤50)	-	-	-
Manganese	940	1100	16 (≤50)	-	_	-

	Concentra	tion (mg/Kg)				
Analyte	SSA07-01-1BPC	SSAO7-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	4.9	5.2	6 (≤50)	-	-	-
Manganese	790	800	1 (≤50)	-	-	-
Cobalt	7.7	9.0	16 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2280-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-1	SA188-3BPC SA188-3BPC_FD SA188-5BPC SSA05-02-1BPC_FD SSA05-02-1BPC_FD SSA05-03-1BPC_FD SSA05-03-1BPC_FD SSA05-03-1BPC_FD SSA05-03-5BPC SSA04-02-1BPC SSA04-02-1BPC SSA06-04-1BPC SSA06-04-1BPC SSA06-04-1BPC SSA06-04-5BPC SA63-5BPC SA63-5BPC_FD SSA06-05-1BPC SSA06-05-1BPC SSA06-05-5BPC_FD SSA07-01-1BPC SSA07-01-1BPC_FD SSA07-01-5BPC	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 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23126N4 Stage 2B SDG #:_ 280-2280-1 Laboratory: Test America

Date: 5-18-16	Ċ
Page: <u>(</u> of <u>)</u>	
Reviewer: _ 🕰	
2nd Reviewer:v	

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/8/10
Ħ.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\sim	Norutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2)(4,5)(7,8)(12,13)(16,17)(19,20)(21,21
ΧV	Field Blanks	SW	FB= FB-04072010-RZC (50611 28022802)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

R = Rinsate

TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

1	SA188-3BPC	11	SSAO4-02-5BPC	21	SSA07-01-1BPC	31	SSAO7-01-5BPCMSD
2	SA188-3BPC_FD	12	SSAO6-04-1BPC	22	SSAO7-01-1BPC_FD	32	
3	SA188-5BPC	13	SSAO6-04-1BPC_FD	23	SSA07-01-5BPC	33	PBS (1-15)
4	SSAO5-02-1BPC	14	SSAO6-04-5BPC	24	SSAO5-02-5BPCMS	34	805(16-23)
5	SSAO5-02-1BPC_FD	15	SA63-1BPC	25	SSAO5-02-5BPCMSD	35	
6	SSAO5-02-5BPC	16	SA63-5BPC	26	SSAO6-04-5BPCMS	36	
7	SSAO5-03-1BPC	17	SA63-5BPC_FD	27	SSAO6-04-5BPCMSD	37	
8	SSAO5-03-1BPC_FD	18	SSAO6-05-1BPC	28	SSAO6-05-1BPCMS	38	
9	SSAO5-03-5BPC	19	SSAO6-05-5BPC	29	SSAO6-05-1BPCMSD	39	
10	SSAO4-02-1BPC	20	SSAO6-05-5BPC_FD	30	SSAO7-01-5BPCMS	40	

Notes:			

LDC #: CN CO/V7 SDG #: 280-2280-\

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

⊬age:_	
Reviewer:	α
2nd reviewer:	<u>~</u>

All circled elements are applicable to each sample.

	i	
Sample ID	Matrix	Target Analyte List (TAL)
1-3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg,(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN. Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN.
4-6		SX
		Al, Sb, As, Ba, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mr, Nr, Hr, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
1910.22		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
1-9,1820		Al, Sb, As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg (Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN;
101161		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
10,11,15-17		Al, Sb, As Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
12-14		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,
- 1 02		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
21-23		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 ⁻ ,
		Al, Sb, As, 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: 24,25		Al, Sb, As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg) Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
1 26,27		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
28,29		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mp, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
3031		Al, Sb, As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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,
IOD		Analysis Method Analysis Method Analysis Method Analysis Method 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,
IGFAA L		Al Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni, K. Se. Ag. Na. Tl. V. Zn. Mo. B. Si, CN

Comments:	Mercury by CVAA if performed	

SDG #: See Cover LDC #: 23126N4

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

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 4, 5

Reason Code: bl

			100000			
Analyte	Maximum PB³ (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Mg			1.65			
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ed: mg/Kg	AS AS	sociated Samples: 6
i i						
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Mg			1.75			
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ed: mg/Kg		
			4			200
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Mg			2.42			
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ted: mg/Kg		11
	The second secon					
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ⁴ (ug/L)	Action Limit	No Qualifiers	
လ			0.0179			
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	otherwise not	ted: <u>mg/Kg</u>		Associated Samples: 19-23
			145		¥	
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Mn			1.20	0.12		

	2nd Reviewer:	
Reason Code: bl		
VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES	Soil preparation factor applied: 100x	Associated Samples: 18
LDC #: <u>23126N4</u> SDG #: See Cover	METHOD : Trace metals (EPA SW 864 Method 6010B/6020/7000)	Sample Concentration units, unless otherwise noted: mg/Kg As

			17	-		
100						
49年 在	-					:
			8-23			
			mples: 1			
			Associated Samples: 18-23			
	No Qualifiers				No Qualifiers	
	Action Limit		Sample Concentration units, unless otherwise noted: mg/Kg		Action Limit	
	Maximum Maximum PB ^a ICB/CCB ^a (ug/L)	0:630	otherwise no		Maximum ICB/CCB ^a (ug/L)	
			nits, unless (T	Maximum PB ^a (ug/L)	
	Maximum PB ^a (mg/Kg)		ucentration u		Maximum PB ^a (mg/Kg)	0.127
	Analyte	Mn	Sample Cor		Analyte	Mn

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

LDC #: 253026/V

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: _of___ 2nd Reviewer: 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: mg/Kg

Field Blank: (be)

Associated Samples: () () () () () () () () () (
fication												
Sample Identification												
	\triangleleft											
	15.en											
	Qual.											
	9/											
	Action Level		15									
Analyte Blank ID	EB-C (SDG	0.093	15									
Analyte		ပိ	Mn									

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

LDC #: 23126N4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of Seviewer: CC

2nd Reviewer:

Field Blank: (bf)

21-23

Associated Samples:

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?

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

100x Sampling date: 4/8/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date: 4/8/10

Sample Identification No Qualifiers Action Level FB-04072010-RZC (SDG#: 280-2280-2) Blank ID 0.016 Analyte ပိ LDC#:_23126N4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Reviewer: 2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

Y N NA Y N NA

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	1	2	RPD	Difference	Limits	(Parent Only)
Manganese	4300	3800	12			

V:\FIELD DUPLICATES\FD_inorganic\23126N4.wpd

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	4	5	RPD	Difference	Limits	(Parent Only)
Arsenic	6.8	8.2	19			
Magnesium	9500	11000	15			

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	7	8	RPD	Difference	Limits	(Parent Only)
Arsenic	4.6	4.4	4			
Manganese	350	470	29			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	12	13	RPD	Difference	Limits	(Parent Only)
Arsenic	1.2	1.5		0.3	(≤0.65)	
Manganese	220	260	17			
Magnesium	5300	7700	37			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	16	17	RPD	Difference	Limits	(Parent Only)
Arsenic	7.5	7.2	4			

LDC#: 23126N4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	19	20	RPD	Difference	Limits	(Parent Only)
Arsenic	7.0	8.1	15			
Manganese	940	1100	16			

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	21	22	RPD	Difference	Limits	(Parent Only)
Arsenic	4.9	5.2	6			
Manganese	790	800	1			
Cobalt	7.7	9.0	16			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 24, 2010

Matrix:

Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-2

Sample Identification

FB-04072010-RZC FB-04072010-RZCMS FB-04072010-RZCMSD

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for 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.

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)	Manganese	0.334 ug/L	All samples in SDG 280-2280-2
ICB/CCB	Cobalt	0.0110 ug/L	All samples in SDG 280-2280-2

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
FB-04072010-RZC	Cobalt	0.016 ug/L	1.0U ug/L

Sample FB-04072010-RZC was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 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 280-2280-2	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 Metals - Data Qualification Summary - SDG 280-2280-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-2	FB-04072010-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 280-2280-2

SDG	Sample	Analyte	Modified Final Concentration		Code
280-2280-2	FB-04072010-RZC	Cobalt	1.0U ug/L	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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LDC #:	23126O4	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2280-2	Stage 2B
Laborator	y: Test America	

	Date: 5-18-10
	Page:of
	Reviewer:
2nd	Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/8/10
11.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	ASW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
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	
X.	Furnace Atomic Absorption QC		NOT Utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	7	
XIV.	Field Duplicates	<i>N</i>	
ΧV	Field Blanks	SW	FB=1 (no associated samples)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Valida	ated Samples:				
1	FB-04072010-RZC	11	PBW	21	31
2	FB-04072010-RZCMS	12		22	32
3	FB-04072010-RZCMSD	13		23	33
4		14		24	34
5		15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:			

LDC#: WILD) SDG#: 280-7280-2

VALIDATION FINDINGS WUKKSHEET Sample Specific Element Reference

Page. <u>`_</u> ∪i
Reviewer: CO
2nd reviewer:

All circled elements are applicable to each sample.

	· · · · · · · · · · · · · · · · · · ·	
Sample ID	Matrix	Target Analyte List (TAL)
١		Al, Sb,(As, Ba, Be, Cd, Ca, Cr,(Co) Cu, Fe, Pb, (Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
W:72		Al, Sb(As, Ba, Be, Cd, Ca, Cr, Cp, Cu, Fe, Pb (Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
900,	· · · · · · · · · · · · · · · · · · ·	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, 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		Ał, Sb, As, 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(A)s, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
GEAA		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 #: 2312604
SDG #: See Cover
METHOD: Trace metals
Sample Concentration t

2604 e Cover race metals	(EPA SW 86	2604 e Cover race metals (EPA SW 864 Method 6010B/6020/ centration units, unless otherwise noted: <u>ug/L</u>	26O4 <u>E Cover</u> race metals (EPA SW 864 Method 6010B/6020/7000) centration units, unless otherwise noted: ug/L	<i>></i> 0.4	VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA Associated Samples: All	INGS WORKS ALIFIED SAMP or applied: No. 1811	HEET LES A	α.	Reason Code: bl	ode: bl	2r	Page: of Beviewer: CA	Page: of sviewer: CA	Page: of Of Deviewer:
	45.6		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1											i i
Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit								 			
		0.0110		0.016 / 1.0										
	0.334											ĵ		

Analyte

Ξ

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

LDC #: 2312604

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer._

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

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

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

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

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

100x Sampling date: 4/8/10 Soil factor applied 100
Field blank type: (circle one) Field Blank / Rinsate / Other. Sampling date: 4/8/10

Associated Samples:__

No Associated Samples

Field Blank: (bf)

Sample Identification Action Level Blank ID 0.016 Analyte රි

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic & Manganese

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-6

Sample Identification

SSAO4-02-3BPC

SSA06-05-3BPC

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 Methods 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.

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Manganese	0.0836 ug/L	SSAO6-05-3BPC

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

Sample EB-04142010-RIG1-RZC (from SDG 280-2448-2) was identified as an equipment blank. No arsenic or manganese was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Manganese	1.6 ug/L	SSAO6-05-3BPC

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 arsenic or manganese was found in this blank.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 280-2280-6	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Data Qualification Summary - SDG 280-2280-6

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-6	SSAO4-02-3BPC SSAO6-05-3BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2280-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Equipment Blank Data Qualification Summary - SDG 280-2280-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-2280-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson HEET

LDC #:	23126R4	VALIDATION COMPLETENESS WORKSH
SDG #:	280-2280-6	Stage 2B
Laboratory:	Test America	•

Date: 5-18-10
Page: ____of ___
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
I.	Technical holding times	A	Sampling dates: 4/8/10
11.	ICP/MS Tune	A	•
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	Ð	MSD (SOGA 280-2216-7)
VII.	Duplicate Sample Analysis	\mathcal{N}	,
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	NONUEITED
XI.	ICP Serial Dilution	A	NOHUE: 1:ZED LSD6#280-2216-7)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	P	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	1 800	FB = FB-04012010 - RZC_EB-EB-04142010-RIG (280-2280-2) (280-2448-2)

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:

	<u> </u>					
1	SSAO4-02-3BPC	11	2BS	21	31	
2	SSAO6-05-3BPC	12		22	32	
3		13	· · · · · · · · · · · · · · · · · · ·	23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	·
9		19		29	39	
10		20		30	40	

Notes:			
		,	

SDG#: <u>See caer</u>

Sample Specific Element Reference

Reviewer: ______

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
	Wattik	
		Al, Sb, As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
2		Al, Sb(As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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		Analysis Method Al Sh Ao Bo Bo Cd Co Cr Co Cu Eo Bh Ma Mh Ha Ni K So Ag No TL V 75 Mo B Si CN
		Al, Sb, As, 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, (Mr) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GEAA		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 #: 23126R4 SDG #: See Cover METHOD: Trace me	26R4 e Cover Trace metals	LDC #: <u>23126R4</u> SDG #: <u>See Cover</u> METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)	34 Method 6	010B/6020/7	(00	VALIDATION FINDINGS PB/ICB/CCB QUALIFII Soil preparation factor ap	VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 2	ORKSHEET SAMPLES ed: 100x	ı	Reason Code: bl	ld	2nc	Page: of Seviewer: CAS	- d
Salipie Co		illie, dilloss									•	_		
Analyte	Maximum PB ^a (mg/Kg)		Maximum PB ^a ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers									
Mn			0.0836											

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: \ of \ Reviewer: \ OK

2nd Reviewer.

Field Blanks

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y\N N/A Were field blanks identified in this SDG?

Y N N/A

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg

Associated Samples: Sampling date: 4/14/10 Soil factor applied 100x Field blank type: (circle one) Field Blank / Rinsate / Other:

Reason: be

			7										$\neg \neg$
cation									-				
Sample Identification													
Sam													
	Q												
	Sien												
	Qualisiens												
	NO												
	Action Level	1	1.6										
Blank ID	EB-04142010-RIG1-RZC (SDG#: 280-2448-2)		1.6	[3									
Analyte		8	Mn	- Mg									

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

May 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-1

Sample Identification

RSAK8-1BPC**

RSAK8-5BPC**

SA42-1BPC**

SA42-5BPC**

SA42-5BPC FD

SA41-2BPC**

SA41-5BPC**

SSAQ4-02-1BPC**

SSAQ4-02-5BPC**

SSAQ4-02-5BPC FD

RSAK8-1BPCMS

RSAK8-1BPCMSD

^{**}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 Methods 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

Samples FB-04072010-RZC (from SDG 280-2280-2), FB-04072010-RZD (from SDG 280-2216-2) and FB04062010-RZB (from SDG 280-2131-1) were identified as field blanks. No arsenic 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 280-2301-1	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 SA42-5BPC** and SA42-5BPC_FD and samples SSAQ4-02-5BPC** and SSAQ4-02-5BPC_FD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentrat	Concentration (mg/Kg)		Difference			
Compound	SA42-5BPC**			(Limits)	Flags	A or P	
Arsenic	3.4	3,3	3 (≤50)	-	-	-	

	Concentration					
Compound	SSAQ4-02-5BPC**	SSAQ4-02- 5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.8	3.8	0 (≤50)	_	-	_

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2301-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2301-1	RSAK8-1BPC** RSAK8-5BPC** SA42-1BPC** SA42-5BPC_FD SA41-2BPC** SA41-2BPC** SA41-5BPC** SSAQ4-02-1BPC** SSAQ4-02-5BPC_FD	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 280-2301-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2301-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B /4

LDC #:_ SDG #: 280-2301-1 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
1.	Technical holding times	A	Sampling dates: 4/9/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
lX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B
XIII.	Overall Assessment of Data	12	<u> </u>
XIV.	Field Duplicates	SW	(4,5),(9,10)
ΧV	Field Blanks	QN	FB = FB-04072010-RZC, FB-04072010-RZD (280-2280-2) (280-2216-2)
	r returbiants		(280-2280-2) (280-2216-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

** Leve FB = Field blank

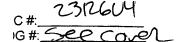
D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

	<u></u>						
1	RSAK8-1BPC * *	11	RSAK8-1BPCMS	21	865	31	
2	RSAK8-5BPC	12	RSAK8-1BPCMSD	22		32	
3	SA42-1BPC	13		23		33	
4	SA42-5BPC	14		24		34	
5	SA42-5BPC_FD	15		25		35	
6	SA41-2BPC **	16		26		36	
7	SA41-5BPC	17		27		37	
8	SSAQ4-02-1BPC	18		28		38	
9	SSAQ4-02-5BPC	19		29		39	
10	SSAQ4-02-5BPC_FD	20		30		40	

Notes:_	*	FB=	FB04062010-RZP	3 (280-2131-1)	

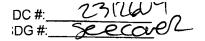


VALIDATION FINDINGS CHECKLIST

Page: _l_of__ Reviewer: ____ 2nd Reviewer: _____

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

Method:Metals (EPA SW 846 Method 6010/7000/6020)	 1		T	
Validation Area	Yes	No	NA	Findings/Comments
l Technical bolding times	en en			
All technical holding times were met.				
Cooler temperature criteria was met.		and the second		478
II. Calibration			1	
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			e de l'agra	The second secon
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.		L		
IV ICP Interference Check Sample				
Were ICP interference check samples performed daily?		1		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			and the control	
IV: Matrix spike/Matrix spike-duplicates				The second secon
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.	<u></u>			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.				
V Laboratory control samples		ァ -		
Was an LCS anaylzed for this SDG?		_	1	
Was an LCS analyzed per extraction batch?	1	1	4	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?		1		



VALIDATION FINDINGS CHECKLIST

Page: Zof _____ Reviewer: _____ 2nd Reviewer: _____

Validation Area	Yes	No	NA	Findings/Comments
W. Rumace Altomic Absorption QC			, Train	
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?	else Lincolnia		10,680.16	To much strike 1993 person and the second
VII. ICP-Seral Dilution: 28		,	Γ	
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
Viti "Internal Standards (EPA SW 846 Method;6020) : 대한				A STATE OF THE STA
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 Résult Véntication		i i	A P	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_			
Xi Overall assessment or gata .				or to Share and the Share and
Overall assessment of data was found to be acceptable.				
XII. Field duplicates 19				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.	/			
XIII: Field blanks as a second of the second			4	
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.	<u> </u>	<u> </u>		

LDC#: 23126U4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

	(
Page:_	of
Reviewer:	0
2nd Reviewer:_	~ <u>~</u>

METHOD: Metals (EPA Method 6020/7000)

ſ	NX	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\23126U4.wpd

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	4	5	RPD	Difference	Limits	(Parent Only)
Arsenic	3.4	3.3	3			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	9	10	RPD	Difference	Limits	(Parent Only)
Arsenic	3.8	3.8	0			

LDC # 23/26/14 SDG #: SEECOVER

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer:__ Page: 2nd Reviewer:

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

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

%R = Found × 100

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)
29	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	As	8'11	40	105	601	<u>)</u>
CC V _{C00} 0	ICP/MS (Continuing calibation)	A5	51.4	50	103	103	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 the recalculated results.

100 # 2/26/14 80G # JER COLON

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:

RPD = <u>IS-DL</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:

%D = |I-SDR| × 100

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

					Recalculated	Reported	
Samole ID	Type of Analysis	Element	Found (S/1) (walls) (MX/KS)	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
ICSAB	ICP interference check	PS		0001	401	701	J-
537	Laboratory centrol sample		50.3	20	701	101	
	Matrix spike		(ssr-sr)	7.72	9,5	25	
21/11	Duplicate		z z	b'57	S	5	
-	ICP serial dilution	>	دا ٔ ا	72.h	6'7	۲.۲	\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 #: US (USU)
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		ted range of the instruments	licable questions are identified as "N/A".
Detector following	ed analy ng equat	rte results for	As	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	(0.92)	(5) (7.94 mg/L) = 4.1 mg/kg 7) (1.04g)

Sample ID	Analyte	Reported Concentration (NS RG)	Calculated Concentration (MS K8)	Acceptable (Y/N)
	(5) As	4.1	4.1	Y
				····
				···.
			·	
			:	
			1	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

May 21, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-7

Sample Identification

SA42-3BPC

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 Methods 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination.

 This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic was found in the initial, continuing and preparation blanks.

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2301-7	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2301-7

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2301-7	SA42-3BPC	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 280-2301-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2301-7

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ET

LDC #:	23126X4	VALIDATION COMPLETENESS WORKSHEI
SDG #:	280-2301-7	Stage 2B
Laborator	y: Test America	

Date: 5-15-10
Page: <u> </u> t of <u>) </u>
Reviewer:
2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/9/10
11.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	IA	
V.	ICP Interference Check Sample (ICS) Analysis	À	
VI.	Matrix Spike Analysis	À	ms/D (SOGX280-2131-9)
VII.	Duplicate Sample Analysis	M	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Notutilizeb (506/280-2131-9)
XI.	ICP Serial Dilution	A	(SD6m280-2131-9)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-04072010-RZC (506\$280-2280-2)

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:

,						
1	SA42-3BPC	11	(B)	21	31	
2		12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 12, 2010

LDC Report Date:

May 21, 2010

Matrix:

Soil

Parameters:

Arsenic & Manganese

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-1

Sample Identification

SSAN7-02-1BPC

SSAN7-02-1BPC FD SSAN7-02-5BPC SSAN3-01-1BPC SSAN3-01-5BPC SSAN3-02-1BPC SSAN3-02-5BPC SSAN2-01-1BPC SSAN2-01-5BPC SA56-3BPC SA56-5BPC SA156-3BPC** SA156-5BPC** SA56-3BPC FD SSAM7-04-1BPC SSAM7-04-5BPC SSAM7-04-5BPC FD SSAM7-03-1BPC

SSAN6-02-1BPC SSAN6-02-1BPC_FD SSAN6-02-5BPC SA156-3BPC_FD SSAN3-02-1BPCMS SSAN3-02-1BPCMSD SSAN2-01-1BPCMS SSAN2-01-1BPCMSD SA156-5BPCMS SA156-5BPCMSD

SSAM7-03-5BPC SSAM7-03-5BPC FD

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 30 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.

Samples EB-04122010-RIG1-RZB and EB-04122010-RIG2-RZC (both from SDG 280-2352-2) were identified as equipment blanks. No arsenic or manganese was found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04122010-RIG2-RZC	4/12/10	Manganese	16 ug/L	SSAN2-01-1BPC SSAN2-01-5BPC SA56-3BPC SA56-5BPC SA56-3BPC_FD

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-04062010-RZB (from SDG 280-2131-1) 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.

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 280-2352-1	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 SSAN7-02-1BPC and SSAN7-02-1BPC_FD, samples SA56-3BPC and SA56-3BPC_FD, samples SSAM7-04-5BPC and SSAM7-04-5BPC_FD, samples SSAM7-03-5BPC and SSAM7-03-5BPC_FD, samples SSAN6-02-1BPC and SSAN6-02-1BPC_FD, and samples SA156-3BPC_FD and SA156-3BPC** were identified as field duplicates. No arsenic or manganese was detected in any of the samples with the following exceptions:

Concentration (mg/Kg)							
Compound	SSAN7-02-1BPC	SSAN7-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	3.6	3.5	3 (≤50)	-	-	-	

	Concentration (mg/Kg)						
Compound	SA56-3BPC	SA56-3BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	2.9	2.9	-	0 (≤0.61)	-	-	
Manganese	330	270	20 (≤50)	-	-	-	

	Concentration (mg/Kg)					
Compound	SSAM7-04-5BPC	SSAM7-04-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	4.2	4.1	2 (≤50)	-	-	-

	Concentration (mg/Kg)					
Compound	SSAM7-03-5BPC	SSAM7-03-5BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	4.3	3.9	10 (≤50)	-	-	_

	Concentration (mg/Kg)					
Compound	SSAN6-02-1BPC	SSAN6-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	4.4	4.7	7 (≤50)	-	-	-

"	Concentrat					
Compound	SA156-3BPC**	SA156-3BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	6.3	3.7	52 (≤50)	-	J (all detects)	Α

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Data Qualification Summary - SDG 280-2352-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2352-1	SSAN7-02-1 BPC SSAN7-02-1 BPC FD SSAN7-02-5 BPC SSAN3-01-1 BPC SSAN3-01-1 BPC SSAN3-02-1 BPC SSAN3-02-5 BPC SSAN2-01-1 BPC SSAN2-01-1 BPC SSAN2-01-5 BPC SA56-3 BPC SA56-3 BPC** SA156-3 BPC** SA56-3 BPC FD SSAM7-04-1 BPC SSAM7-04-5 BPC SSAM7-04-5 BPC SSAM7-03-5 BPC SSAM7-03-5 BPC SSAM7-03-5 BPC SSAM7-03-5 BPC SSAN6-02-1 BPC SSAN6-02-1 BPC SSAN6-02-5 BPC SAN6-02-5 BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-2352-1	SA156-3BPC** SA156-3BPC_FD	Arsenic	J (all detects)	А	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Equipment Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ENESS WORKSHEET 2B /4

LDC #:	23126Y4	_ VALIDATION COMPLETI
SDG #:	280-2352-1	_ Stage
Laborato	ry: Test America	

Date: 5-18-10
Page: 1_of
Reviewer: $\sqrt{2}$
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: 4/12/10
11.	ICP/MS Tune	H	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/D
VII.	Duplicate Sample Analysis	\mathcal{N}	'/
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	- Ne.)
X.	Furnace Atomic Absorption QC	\mathcal{N}	Notutilizeb
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2), (10,14), (16,17), (19,20), (21,22), (24,12) FB = FB - 64072010 - BZC, FB04062010- RZ (280-72280-2) (3068 2802131-1)
XV	Field Blanks	ツ晦	FB=FB-64072610-BZC,FB04062010-RZ

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank * there 4

D = Duplicate TB = Trip blank

EB = Equipment blank

(306* 2802131-1) *Seebeby

Validated Samples:

1	SSAN7-02-1BPC	11	SA56-5BPC	21	SSAN6-02-1BPC	31	PBS (1-14)
2	SSAN7-02-1BPC_FD	12	SA156-3BPC	22	SSAN6-02-1BPC_FD	32	PB5(15-24)
3	SSAN7-02-5BPC	13	SA156-5BPC	23	SSAN6-02-5BPC	33	
4	SSAN3-01-1BPC	14	SA56-3BPC_FD	24	SA156-3BPC_FD	34	
5	SSAN3-01-5BPC	15	SSAM7-04-1BPC	25	SSAN3-02-1BPCMS	35	
6	SSAN3-02-1BPC	16	SSAM7-04-5BPC	26	SSAN3-02-1BPCMSD	36	
7	SSAN3-02-5BPC	17	SSAM7-04-5BPC_FD	27	SSAN2-01-1BPCMS	37	
8	SSAN2-01-1BPC	18	SSAM7-03-1BPC	28	SSAN2-01-1BPCMSD	38	
9	SSAN2-01-5BPC	19	SSAM7-03-5BPC	29	SA156-5BPCMS	39	
10	SA56-3BPC	20	SSAM7-03-5BPC_FD	30	SA156-5BPCMSD	40	

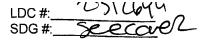
Notes:	* EB=	EB-04 122010-	RIGI-RZB	(280-2352-2)	
		EB-04122010-	R162-RZC	L ,	

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7 Reviewer: 6 2nd Reviewer: 1

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

Welfield Area	Yes	No	NA	Findings/Comments
Validation Area I Technical fiolding times	162	NO.	IVA	Triumga Commente
All technical holding times were met.		,		
Cooler temperature criteria was met.				
II Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution < 5%?				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury and 85-115% for cyanide) QC limits?				
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	1115			And the second s
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		Paranta and Salahara		
IV. Matrix spike/Matrix spike duplicates				The Control of the Co
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.	/	7		
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?	1			
Was an LCS analyzed per extraction batch?		ļ		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			



VALIDATION FINDINGS CHECKLIST

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

Validation Area	V	N.		Findings/Comments
Validation Area VI. Furnace Atomic Absorption QC	Yes	No	NA	Findings/Comments
If MSA was performed, was the correlation coefficients > 0.995?				
Do all applicable analysies have duplicate injections? (Level IV only)				
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)				7
Were analytical spike recoveries within the 85-115% OC limits?				
VII: ICP Serial Dilution	-031			
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
Will 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 Associance and Quality Control 😅				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?		- 19A		and the second s
X Sample Result-Verification:			2	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI. Overallassessment of data	****			
Overall assessment of data was found to be acceptable.				
XII. Eleid duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XIII Field blanks:			and the	and the second of the second o
Field blanks were identified in this SDG.	/		/	
Target analytes were detected in the field blanks.				

SDG#: SECONOL

Sample Specific Element Reference

Reviewer: CR 2nd reviewer: V

All circled elements are applicable to each sample.

Sample ID		Target Analyte List (TAL)
1-7,12,13,15	24	Al, Sb, As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
8:11.14		Al, Sb,(As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg (Mr), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
00:25,26		Al, Sb(As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
27,88		Al, Sb, Ag, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
12930		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	<u></u>	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,
GEAA		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	

73/26/7 LDC#_23294D4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Page: \of \

2nd Reviewer._ Reviewer:_

Field Blanks

Field Blank: (be)

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg Soil factor applied _ Sampling date: 4/12/10 N N/A

Were field blanks identified in this SDG?

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

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

Associated Samples: 8-11,14

								 	 	 	 	 	 _
ation					-								
Sample Identification													
S	,												
	Por												
	NO QUALIFICAD			-									
	No			,									
	Action Level		16	83									
Blank ID	12-RZC 52-2)	0.11	16	69									
Analyte	100	8	Mn	8									

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

LDC#: 23126Y4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Reviewer 2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	1	2	RPD	Difference	Limits	(Parent Only)	
Arsenic	3.6	3.5	3				

V:\FIELD DUPLICATES\FD_inorganic\23126Y4.wpd

	Concentration	on (mg/Kg)	g/Kg) (≤50) (mg/Kg) (m			Qualifications	
Compound	10	14	RPD	Difference	Limits	(Parent Only)	
Arsenic	2.9	2.9		0	(≤0.61)		
Manganese	330	270	20				

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	16	17	RPD	Difference	Limits	(Parent Only)	
Arsenic	4.2	4.1	2	-			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	19	20	RPD	Difference	Limits	(Parent Only)
Arsenic	4.3	3.9	10			

	Concentration	on (mg/Kg)	(≤50)	Qualifications		
Compound	21	22	RPD	Difference	Limits	(Parent Only)
Arsenic	4.4	4.7	7			

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	12	24	RPD	Difference	Limits	(Parent Only)
Arsenic	6.3	3.7	52			Jdet/A (fd)

SDG# 23/26 44 SDG# SERCOLOR

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: GS 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 × 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
TCV	ICP/MS (Initial calibration)	As	41.8	0h	105	501) —
$CCV_{CZ3:A}$	ICP/MS (Continuing calibation)	つ つ	125'4	50	105	105)—

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# 2372644 SDG#566000

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer:__ Reviewer:_

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

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

%R = Found × 100 True

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

True = Concentration of each analyte in the source.

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

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

					Recalculated	Reported	
CICIAMO	Tyme of Analysis	Element	Found/S/1 K	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
TUSAR	ICP interference check	Ps	[33	001	103	167)_
557	Laboratory centrol sample		7.12	70	106	301	
25	Matrix spike		(ssr-sr) 7, 9, 1	h'81	hol	104	
92/52	Duplicate		0' 12	7.55.1	7	7	
2	ICP serial dilution	>	∑. %.	5,06	5,4	レ'カ	\
4							

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

LDC #: V3/U/4 SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: _____of \\
Reviewer: _____2nd reviewer: _____

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

Please W N Y N Y N	see qua <u>N/A</u> <u>N/A</u> <u>N/A</u>	have results been reported and	calculated correctly? range of the instruments and	e questions are identified as "N/A".
	ed analy ng equat	te results for	As	were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	1. (1 co 10/1)
RD FV In. Vol. Dil %S	= = = = = = = = = = = = = = = = = = = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids		(5) (1.89 mg/L) = 6.3 mg/log 9) (1.05g)

<u> </u>				
Sample ID	Analyte	Reported Concentration	Calculated Concentration (MC Kg)	Acceptable (Y/N)
AS 12	es As	6,3) (<u>)</u> ()	7
			:	
			1	

Tronox PCS Data Validation Reports LDC# 23126

Perchlorate



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-1

Sample Identification

SSA06-02-1BPC FD

SSA06-02-1BPC

SSA06-02-5BPC

SSA06-02-9BPC

SSA06-02-10BPC

SSA06-02-5BPCMS

SSA06-02-5BPCMSD

SSA06-02-5BPCDUP

Introduction

This data review covers 8 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.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSA06-02-5BPCMS/MSD (All samples in SDG 280-2131-1)	Perchlorate	-	127 (75-125)	-	J+ (all detects)	А

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 280-2131-1	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

Samples SSA06-02-1BPC_FD and SSA06-02-1BPC were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concentrati	on (mg/Kg)		Difference		
Analyte	SSA06-02-1BPC_FD	SSA06-02-1BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	8.5	9.2	8 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2131-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-1	SSA06-02-1BPC_FD SSA06-02-1BPC SSA06-02-5BPC SSA06-02-9BPC SSA06-02-10BPC	Perchlorate	J+ (all detects)	А	Matrix spike/Matrix spike duplicates (%R) (m)
280-2131-1	SSA06-02-1BPC_FD SSA06-02-1BPC SSA06-02-5BPC SSA06-02-9BPC SSA06-02-10BPC	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 280-2131-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2131-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

_DC #:23126A6	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2131-1	_ Stage 2B
_aboratory: <u>Test America</u>	

Date: 5-18-10
Page: Lof
Reviewer:
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: 4/6/10
lla.	Initial calibration	A	, ,
IIb.	Calibration verification	A	
111.	Blanks	A	,
IV	Matrix Spike/Matrix Spike Duplicates	SW	ms/D
V	Duplicates		O.C.
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	·
VIII.	Overall assessment of data	A	
iX.	Field duplicates	ŚW	(1,2)
_ X	Field blanks	ND	FB=FB-64072010-RZC (280-2280-Z)

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:

	<u> </u>				 	
1	SSA06-02-1BPC_FD	11	805	21	 31	
2	SSA06-02-1BPC	12		22	32	
3	SSA06-02-5BPC	13		23	33	
4	SSA06-02-9BPC	14		24	34	
5	SSA06-02-10BPC	15		25	35	
6	SSA06-02-5BPCMS	16		26	36	
7	SSA06-02-5BPCMSD	17		27	37	
8	SSA06-02-5BPCDUP	18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	 		

9H97157	Second
LDC #:	SDG#:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

METHOD: Inorganics, EPA Method_

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?

ΑN.

Were matrix spike percent recoveries (%R) within the control limits of 75-1259 If the sample concentration exceeded the spike concentration by a factor

of 4 or more, no action was taken. N/N/A

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

LEVEL IV ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Qualifications	JADOE/A (m)											
Associated Samples	lΨ											
RPD (I imits)												
MSD %Recovery	127											
MS "Rocovery												
Analyte	Clay						i i					
Moteric	19											
Ci Comon	00											

Comments:

LDC#: 23126A6 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

1 1	
Page: _ \ of _ \	
Reviewer:	
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?

	Concentrati	on (mg/Kg)				Qualification (Parent only)	
Analyte	1	2	RPD (≤50)	Difference	Limits		
Perchlorate	8.5	9.2	8				

V:\FIELD DUPLICATES\FD_inorganic\23126A6.wpd

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:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-1

Sample Identification

SA39-3BPC

SA39-5BPC

Introduction

This data review covers 2 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSA06-02-5BPCMS/MSD (All samples in SDG 280-2216-1)	Perchlorate	-	127 (75-125)	-	J+ (all detects)	А

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 280-2216-1	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 280-2216-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-1	SA39-3BPC SA39-5BPC	Perchlorate	J+ (all detects)	А	Matrix spike/Matrix spike duplicates (%R) (m)
280-2216-1	SA39-3BPC SA39-5BPC	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 280-2216-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-2216-1

No Sample Data Qualified in this SDG

SDG	#:23126F6 #:280-2216-1 ratory:_Test America		onox Northgate Henderson ON COMPLETENESS WORKSHEET Stage 2B								Date: 5-16-16 Page: _of_1 Reviewer: _C2 2nd Reviewer: \				
MET	HOD: (Analyte) Perchl	orate	(EPA Meth	od 314.0)			<u></u>	n.c				_			
	samples listed below were ation findings worksheets.		ewed for ea	ch of the fo	ollow	ing va	alidati	on area	s. Validat	ion find	dings are no	oted in at	ached		
	Validation	Area							Com	ments					
	Technical holding times			IA	Sami	pling d	ates:	4/7	/10						
IIa.				A											
IIb.	Calibration verification			P											
III.	Blanks			B											
IV	Matrix Spike/Matrix Spike D	SW	~	15/	D	<u>(S06</u>	X 28	7 0-	2131-	1)					
V	Duplicates	A	6	پن (>		1	/							
VI.	Laboratory control samples			A	L	<u>es</u>	71								
VII.	Sample result verification			N		-									
VIII	. Overall assessment of data			A,											
IX.	Field duplicates			N											
X	Field blanks		,	ND	F	B=	FB	-04	072010	<u>) – R</u>	2C				
Vote: √alida	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples:	•	R = Rin	o compound: sate eld blank	s dete	cted		D = Dup TB = Tri	licate		9-2)				
1	SA39-3BPC	11	PB 5	A		21				31					
2	SA39-5BPC	12				22				32					
3		13				23				33					
4		14				24		·		34					
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7		17				27				37					
8		18				28				38					
9	-	19				29				39					

Notes:_					 		

100 # 2326 FE SDG # SECCOLO

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer:_ 2nd Reviewer._ Page:

METHOD: Inorganics, EPA Method 3140

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AN N(Y

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) N/A

"N/A".

of 4 or more, no action was taken.

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

EVEL TOONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

			 	 	_	 _				 =	_	 		 _	_	$\overline{}$
Qualifications	J+det/A	-		And the second s					was displayed and the state of							
Associated Samples										a de la composition della comp						
RPD (Limits)																
MSD %Recovery	127															
MS %Recovery											A proposed and the second seco					
Analyte	1010															
Matrix	11	ll														
OI OSW/SW	S.A06-02-58PC	(50648 280-2131-1)														
#				<u> </u>	L	L	<u></u>	<u>L_</u>	<u></u>			<u></u>	<u>L_</u>	L		<u></u>

Comments:

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/Water

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-2

Sample Identification

RSAR7-4BPC

RSAR7-6BPC

RSAR7-8BPC

FB-04072010-RZD

Introduction

This data review covers 3 soil samples and one water sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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 FB04062010-RZB (from SDG 280-2131-2) and FB-04072010-RZD were identified as field blanks. No perchlorate was found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples			
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All soil samples in SDG 280-2216-2			

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

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) 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 280-2216-2	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 280-2216-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-2	RSAR7-4BPC RSAR7-6BPC RSAR7-8BPC FB-04072010-RZD	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 280-2216-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2216-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

LDC #: 23126G6 SDG #: 280-2216-2

Calibration verification

Matrix Spike/Matrix Spike Duplicates

Blanks

Duplicates

Page: \ of \

Labor	atory. Test America		2nd Reviewer:
METH	HOD: (Analyte) Perchlorate (EPA	Method 314.0)	
	amples listed below were reviewed for tion findings worksheets.	or each of the fo	ollowing validation areas. Validation findings are noted in attached
	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/7/10
lla.	Initial calibration	A 100	

Field blanks Note:

llb.

111.

IV V

VI.

VII.

VIII.

IX.

A = Acceptable

Field duplicates

N = Not provided/applicable SW = See worksheet

Laboratory control samples

Sample result verification

Overall assessment of data

ND = No compounds detected

Ν

R = Rinsate

FB = Field blank

(250-2/3)-2 D = Duplicate

SOGA 280-2280-1

TB = Trip blank

EB = Equipment blank

Validated Samples: Water

1	RSAR7-4BPC	S	11	BBM	21	31	
2	RSAR7-6BPC		12	965	22	32	
3	RSAR7-8BPC	$\underline{\hspace{0.1cm}}$	13		23	33	
4	FB-04072010-RZD	W	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 #: See Cover LDC #: 23204A6

VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer:_ 2nd Reviewer:

Field Blanks

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

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg

Sampling date: 4/6/10 Soil factor applied 10x Field blank Rinsate / Other.

Associated Samples: 1711 So. 1 Reason Code: bf

ification					
Sample Identification					
Action Limit		9.2			
Blank ID	<u>я</u> 🕅	95			
Analyte	Control of the Contro	CIO			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-1

Sample Identification

SSAO5-02-10BPC

SSAO5-02-2BPC

SSAO5-02-4BPC

SSAO5-02-6BPC

SSAO5-02-8BPC

SSA07-01-1BPC

SSAO7-01-1BPC FD

SSA07-01-5BPC

SSAO7-01-5BPCMS

SSAO7-01-5BPCMSD

SSAO7-01-5BPCDUP

Introduction

This data review covers 11 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.

Sample EB-04072010-RZC (from SDG 280-2383-1) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04072010-RZC	4/8/10	Perchlorate	1.2 ug/L	All samples in SDG 280-2280-1

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 analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2280-1	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

Samples SSAO7-01-1BPC and SSAO7-01-1BPC_FD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concentrat	tion (mg/Kg)				
Analyte	SSAO7-01-1BPC	SSAO7-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	110	110	0 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2280-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-1	SSAO5-02-10BPC SSAO5-02-2BPC SSAO5-02-4BPC SSAO5-02-6BPC SSAO5-02-8BPC SSAO7-01-1BPC SSAO7-01-1BPC_FD SSAO7-01-5BPC	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 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2280-1

No Sample Data Qualified in this SDG

SDG # Labora	:23126N6 VALIDA :280-2280-1 atory: Test America OD: (Analyte) Perchlorate (EPA	TION COMP S	thgate Henderson LETENESS WORKSHEET tage 2B	Date: 5-18 Page: 1 of 1 Reviewer: 62 2nd Reviewer: 1
	imples listed below were reviewed for ion findings worksheets.	or each of the fo	ollowing validation areas. Validatio	on findings are noted in attached
	Validation Area		Comm	nents
1.	Technical holding times	\Box	Sampling dates: 4/8/10	
lla.	Initial calibration	A		
lib.	Calibration verification	À		
111.	Blanks	K		
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D	
V	Duplicates	A	DR.	
VI.	Laboratory control samples	A	LC3/D	
VII.	Sample result verification	N		
VIII.	Overall assessment of data	A		
IX.	Field duplicates	SW	(5,6) (6,7)	
Lx	Field blanks	SWAG	FB = FB - 04072010-	RZC (25022802)
Note:	N = Not provided/applicable R	ID = No compounds R = Rinsate B = Field blank	ES = E6-04072010- R7 s detected D = Duplicate TB = Trip blank EB = Equipment blar	•
Validate	d Samples:			

1	SSAO5-02-10BPC	11	SSAO7-01-5BPCDUP	21	PBS	31
2	SSAO5-02-2BPC	12		22		32
3	SSAO5-02-4BPC	13		23		33
4	SSAO5-02-6BPC	14		24		34
5	SSAO5-02-8BPC	15		25		35
6	SSAO7-01-1BPC	16		26		36
7	SSAO7-01-1BPC_FD	17		27		37
8	SSAO7-01-5BPC	18		28		38
9	SSAO7-01-5BPCMS	19		29		39
10	SSAO7-01-5BPCMSD	20		30		40

Notes:		

SDG #: See Cover LDC #: 23204E6

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer. O.C.

2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

Were target analytes detected in the field blanks? Were field blanks identified in this SDG? YN N/A Y/N N/A

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/8/10

Reason Code: be

Sampling date: 4/8/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Sample Identification Associated Samples: HISK Nogbols **Action Limit** 0.12 EB-04072010-RZC (SDG#: 280-2383-1) Blank ID 1.2 Analyte

CIO4

EB-04072010-RZC -CloO4.wpd

LDC#:	23126N6
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

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

Inorganics, Method: See Cover

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

	Concentrati	on (mg/Kg)				Ouglification	
Analyte	6	7	RPD (≤50)	Difference	Limits	Qualification (Parent only)	
Perchlorate	110	110	0				

V:\FIELD DUPLICATES\FD_inorganic\23126N6.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil/Water

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-2

Sample Identification

SA104-4BPC

SA104-6BPC

SA104-6BPC FD

SA104-8BPC

FB-04072010-RZC

Introduction

This data review covers 4 soil samples and one water sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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.

Sample EB-04072010-RZC (from SDG 280-2383-1) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Sampling Equipment Blank ID Date		Analyte	Concentration	Associated Samples	
EB-04072010-RZC	3-04072010-RZC 4/8/10 F		1.2 ug/L	All soil samples in SDG 280-2280-2	

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 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 280-2280-2	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

Samples SA104-6BPC and SA104-6BPC_FD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concentrati	on (mg/Kg)					
Analyte	SA104-6BPC	SA104-6BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Perchlorate	930	1300	33 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2280-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-2	SA104-4BPC SA104-6BPC SA104-6BPC_FD SA104-8BPC FB-04072010-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 280-2280-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-2280-2

No Sample Data Qualified in this SDG

Tronox Northaate Henderson

LDC #: 2312606	VALIDATION COMPLETENESS WORKSHEET	Date: <u>5-18-1</u> 6
SDG #: 280-2280-2	Stage 2B	Page: <u>1</u> of <u>1</u>
Laboratory: Test America	· -	Reviewer: CR
		2nd Reviewer:
METHOD: (Analyte) Pe	erchlorate (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: 4/8/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
111.	Blanks	10	_ ,
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D (S06 * 280-2280-1)
V	Duplicates	A	Oup I
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	Sw	(2,3)
x	Field blanks SN	100	FB=5, EB=04072010-RZC

Note:

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

ND = No compounds detected

R = Rinsate FB = Field blank (260-7383-1) D = Duplicate

TB = Trip blank

EB = Equipment blank

soil/water Validated Samples:

		_				 	
1	SA104-4BPC	<u></u>	11	865	21	31	
2	SA104-6BPC		12	RBW	22	32	
3	SA104-6BPC_FD		13		23	33	
4	SA104-8BPC		14		24	 34	
5	FB-04072010-RZC V	N	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 #: See Cover LDC #: 23204E6

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page:___Reviewer:__ 2nd Reviewer:_

> METHOD: Inorganics, EPA Method See Cover N N/A

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: mg/Kg

EB Sampling date: 4/8/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples: 1 So 1 Reason Code: be

Sample Identification					
Sample Ide					
	0900/5				
	Nog				
Action Limit		0.12			
Blank ID	EB-04072010-RZC (SDG#: 280-2383-1)	1.2			
Analyte		CIO4			

LDC#: 23126O6 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: (_of	
Reviewer: C/2	
2nd Reviewer:	_

Inorganics, Method: See Cover

Y)N NA

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

	Concentration (mg/Kg)		Concentration (mg/Kg)					Qualification
Analyte	2	3	RPD (≤50)	Difference	Limits	(Parent only)		
Perchlorate	930	1300	33					

V:\FIELD DUPLICATES\FD_inorganic\23126O6.wpd

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 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-6

Sample Identification

SSAM7-03-2BPC

SSAM7-03-3BPC

SSAM7-03-4BPC

Introduction

This data review covers 3 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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.

Sample EB-04122010-RIG2-RZC (from SDG 280-2352-2) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04122010-RIG1-RZC	4/12/10	Perchlorate	8.4 ug/L	All samples in SDG 280-2352-6

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 perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2352-6	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 280-2352-6

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2352-6	SSAM7-03-2BPC SSAM7-03-3BPC SSAM7-03-4BPC	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 280-2352-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2352-6

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2352-6

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

LDU #	2312030	A WF
SDG #:_	280-2352-6	
Laborate	ory: Test America	

LDC # 2242600

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
l.	Technical holding times	A	Sampling dates: 4/210
IIa.	Initial calibration	Α	
Ilb.	Calibration verification	P	
III.	Blanks	$\langle \rangle$	
IV	Matrix Spike/Matrix Spike Duplicates	λ	Client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	\mathcal{N}	
Х	Field blanks SW	MO	FB=FB-04072010-KZC, EB=EB-04122010 RTG2
ote:	A = Acceptable ND = N	o compound	FB = FB-0+072010-RZC, EB=EB-04122010 RT 62 (250-2250-2) (250-2352-2) s detected D = Duplicate

N = Not provided/applicable

SW = See worksheet

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	SSAM7-03-2BPC	11	PBS	21	31	
2	SSAM7-03-3BPC	12		22	32	
3	SSAM7-03-4BPC	13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		 	
_			

SDG #: See Cover LDC #: 23204D6

VALIDATION FINDINGS WORKSHEET

Reviewer:_ 2nd Reviewer:

Field Blanks

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

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

Reason Code: be

Sampling date: 4/12/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

E

Sample Identification Associated Samples: **Action Limit** 0.84 EB-04122019-RIG2-RZC (SDG#: 280-2352-2) Blank ID 8.4 Analyte CIO4

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-1

Sample Identification

SSAM6-01-10BPC

SSAM6-01-2BPC

SSAM6-01-4BPC

SSAM6-01-6BPC

SSAM6-01-8BPC

SSAM6-01-8BPC FD

RSAM5-4BPC

RSAM5-6BPC

RSAM5-8BPC

SA65-4BPC

SA65-4BPC FD

SA65-6BPC

SA65-8BPC

SSAM6-01-10BPCMS

SSAM6-01-10BPCMSD

SSAM6-01-10BPCDUP

Introduction

This data review covers 16 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.

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAM6-01-10BPCMS/MSD (All samples in SDG 280-2301-1)	Perchlorate	-	74 (75-125)	-	J- (all detects) UJ (all non-detects)	А

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2301-1	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

Samples SSAM6-01-8BPC and SSAM6-01-8BPC_FD and samples SA65-4BPC and SA65-4BPC_FD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concentra	200	B.44				
Analyte	SSAM6-01-8BPC	SSAM6-01-8BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Perchlorate	2700	2300	16 (≤50)	-	-	-	

	Concentrati					
Analyte	SA65-4BPC	SA65-4BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	1100	1500	31 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2301-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2301-1	SSAM6-01-10BPC SSAM6-01-2BPC SSAM6-01-4BPC SSAM6-01-6BPC SSAM6-01-8BPC SSAM6-01-8BPC_FD RSAM5-4BPC RSAM5-6BPC RSAM5-8BPC SA65-4BPC SA65-4BPC_FD SA65-6BPC SA65-8BPC	Perchlorate	J- (all detects) UJ (all non-detects)	Р	Matrix spike/Matrix spike duplicates (%R) (m)
280-2301-1	SSAM6-01-10BPC SSAM6-01-2BPC SSAM6-01-4BPC SSAM6-01-6BPC SSAM6-01-8BPC SSAM6-01-8BPC_FD RSAM5-4BPC RSAM5-6BPC RSAM5-8BPC SA65-4BPC_SA65-4BPC_SA65-4BPC_SA65-4BPC_SA65-8BPC	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 280-2301-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2301-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23126U6 Stage 2B SDG #: 280-2301-1 Laboratory: Test America

Date: 5-18-16)
Page: \of \	
Reviewer:	
2nd Reviewer: V	

METHOD: (Analyte)	Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 4/9/10
IIa.	Initial calibration	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	,
IIb.	Calibration verification	N	
III.	Blanks	N S	
IV	Matrix Spike/Matrix Spike Duplicates	SW	mS/D
V	Duplicates	\mathcal{N}	
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	AN	Horreviewed for level III
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(5,6), (10,11)
X	Field blanks	NO	FB=FB-04072010-RZC (280-2280-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>						
1	SSAM6-01-10BPC	11	SA65-4BPC_FD	21	065	31	
2	SSAM6-01-2BPC	12	SA65-6BPC	22		32	
3	SSAM6-01-4BPC	13	SA65-8BPC	23		33	
4	SSAM6-01-6BPC	14	SSAM6-01-10BPCMS	24		34	
5	SSAM6-01-8BPC	15	SSAM6-01-10BPCMSD	25		35	
6	SSAM6-01-8BPC_FD	16	SSAM6-01-10BPCDUP	26		36	
7	RSAM5-4BPC	17		27		37	
8	RSAM5-6BPC	18		28		38	
9	RSAM5-8BPC	19		29		39	
10	SA65-4BPC	20		30		40	

Notes:			

SDG# 23126126 SDG# 380 COVER

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer:_ Page: 2nd Reviewer:

METHOD: Inorganics, EPA Method 314,0

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

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

Y(N)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?

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

J-/UJ/A (m)																			TO THE PARTY OF TH	
Associated Samples																				
KPD (Limits)																				
74																				
%Recovery			1																	
C O C														:						
Watrix S 1																				
21/71																				
	$ S_{O} $ C $ C_{O} $	10 June 10 Jun	So il ClOy Arecovery Arecovery Associated Samples	So il ClOy Arecovery Replimits Associated Samples	Soil ClOu Take Covery Restrictions and the samples of the sample of the samples of the samples of the sample of	Soil ClOu Transcrate All	Soil ClOu Take Covery Repliming Association Samples	Soil ClOy Takecovery Repliming Association Samples	Soil ClOy The County Associated Samples and County Associated Samp	Soil ClOu Serecovery Repliming Associated Samples	Soil ClOy The County Restrictions of the Cloy of the C	Soil ClOy 74 April miles and an All	Soil ClOy The Court And The Co	Soil ClOy THE MAN TAKE CONTROL OF THE CONTROL OF TH	Soil ClOy Treemen The All All	Soil ClOy Adams Account Adams	Soil ClOy Accounty Ac	Soil CIOU Accounty THE ACCOUNTY ACCOUNT	Soil ClOy Type Andrews The Control of the Control o	Soil ClOy Secondly Assurated Samples of the Cloy of th

Comments:

LDC#:_2	<u> 23126U6</u>
SDC#	Soo Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

2nd Reviewer:

Inorganics, Method: See Cover

YN NA

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

	Concentrati	on (mg/Kg)				Ovelification	
Analyte	5	6	RPD (≤50)	Difference	Limits	Qualification (Parent only)	
Perchlorate	2700	2300	16				

V:\FIELD DUPLICATES\FD_inorganic\23126U6.wpd

	Concentrati	on (mg/Kg)				Qualification	
Analyte	10	11	RPD (≤50)	Difference	Limits	(Parent only)	
Perchlorate	1100	1500	31			:	

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 24, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-1

Sample Identification

SA156-3BPC**

SA156-5BPC**

SSAM7-03-1BPC

SSAM7-03-5BPC

SSAM7-03-5BPC FD

SSAJ3-02-1BPC

SSAJ3-02-5BPC

SSAJ3-02-1BPC-FD

RSAJ2-5BPC FD

RSAJ2-2BPC

RSAJ2-5BPC

SA156-5BPCMS

SA156-5BPCMSD

SA156-5BPCDUP

SSAJ3-02-5BPCMS

SSAJ3-02-5BPCMSD

SSAJ3-02-5BPCDUP

RSAJ2-2BPCMS

RSAJ2-2BPCMSD

RSAJ2-2BPCDUP

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 20 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-04122010-RIG1-RZB, EB-04122010-RIG2-RZC, and EB-04122010-RIG3-RZD (all from SDG 280-2352-2) 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-04122010-RIG2-RZC	4/12/10	Perchlorate	8.4 ug/L	SSAM7-03-1BPC SSAM7-03-5BPC SSAM7-03-5BPC_FD

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), FB-04072010-RZD (from SDG 280-2216-2), and FB-04062010-RZB (from SDG 280-2131-2) were identified as field blanks. No perchlorate was found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04062010-RZB	4/6/10	Perchlorate	92 ug/L	SA156-3BPC** SA156-5BPC**

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

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses 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
RSAJ2-2BPCMS/MSD (SSAJ3-02-1BPC SSAJ3-02-5BPC SSAJ3-02-1BPC-FD RSAJ2-5BPC_FD RSAJ2-2BPC RSAJ2-5BPC)	Perchlorate	136 (75-125)	-	-	J+ (all detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2352-1	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 SSAM7-03-5BPC and SSAM7-03-5BPC_FD, samples SSAJ3-02-1BPC and SSAJ3-02-1BPC-FD, and samples RSAJ2-5BPC_FD and RSAJ2-5BPC were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentrat	RPD					
Analyte	SSAM7-03-5BPC	SSAM7-03-5BPC_FD	(Limits)	Difference (Limits)	Flags	A or P	
Perchlorate	430	450	5 (≤50)	-	-	-	

Analyte	Concentrat	PDD				
	SSAJ3-02-1BPC	SSAJ3-02-1BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	1.8	2.1	15 (≤50)	-	-	-

Analyte	Concentrati	DDD				
	RSAJ2-5BPC_FD	RSAJ2-5BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	81	130	46 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2352-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2352-1	SSAJ3-02-1BPC SSAJ3-02-5BPC SSAJ3-02-1BPC-FD RSAJ2-5BPC_FD RSAJ2-2BPC RSAJ2-5BPC	Perchlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-2352-1	SA156-3BPC** SA156-5BPC** SSAM7-03-1BPC SSAM7-03-5BPC_FD SSAJ3-02-1BPC SSAJ3-02-5BPC SSAJ3-02-1BPC-FD RSAJ2-5BPC_FD RSAJ2-5BPC RSAJ2-5BPC	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 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2352-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ENESS WORKSHEET

LDC #: 23126Y6	VALIDATION COMPLETE
SDG #: 280-2352-1	Stage
Laboratory: Test America	_

Date: <u>5-18-</u> 10	۶
Page: <u>↓</u> of <u></u>	
Reviewer:	,
2nd Reviewer:	_

METHOD: (Analyte)	Perchlorate (EPA Method 314.0)
METHOD: (Analyte)	Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/12/10
lla.	Initial calibration	A	, , , , ,
Ilb.	Calibration verification	A	
III.	Blanks	K	
IV	Matrix Spike/Matrix Spike Duplicates	SW	mSD
V	Duplicates	A	PP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	Not reviewed fox level 4
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(4,5), (6,8), (9,11)
X	Field blanks	SWA	FB=FB04072010-RZC,FB-04072010-RZD,FB=FB040

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

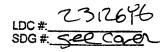
(280-22 80 - 2) D = Duplicate

TB = Trip blank EB = Equipment blank * see beby

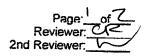
Validated Samples:

	<u></u>				
1	SA156-3BPC **	11	RSAJ2-5BPC	21	31 PBS
2	SA156-5BPC * A	12	SA156-5BPCMS	22	32 PBS
3	SSAM7-03-1BPC	13	SA156-5BPCMSD	23	33
4	SSAM7-03-5BPC	14	SA156-5BPCDUP	24	34
5	SSAM7-03-5BPC_FD	15	SSAJ3-02-5BPCMS	25	35
6	SSAJ3-02-1BPC	16	SSAJ3-02-5BPCMSD	26	36
7	SSAJ3-02-5BPC	17	SSAJ3-02-5BPCDUP	27	37
8	SSAJ3-02-1BPC-FD	18	RSAJ2-2BPCMS	28	38
9	RSAJ2-5BPC_FD	19	RSAJ2-2BPCMSD	29	39
10	RSAJ2-2BPC	20	RSAJ2-2BPCDUP	30	40

Notes:	* EB= EB-04172010-RIGZ-RZC (280-2352-2)
	EB-04122010- RIGI-REB	\ . \ \	d'
	EB-04122010-RIG3-RZD		



VALIDATION FINDINGS CHECKLIST



Method: Inorganics (EPA Method Second)

Method:Inorganics (EPA Method Seccosity				
Validation Area	Yes	No	NA	Findings/Comments
Especiatical helding times.				
All technical holding times were met.		1		·
Cooler temperature criteria was met.				
fiscalization - Control of the Contr				
Were all instruments calibrated daily, each set-up time?	$\!$		<u> </u>	
Were the proper number of standards used?	<u> </u>		<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>			<u> </u>
Were balance checks performed as required? (Level IV only)				
III/Bails 1975 Bloom Bails 1971 Bloom Bails 1975 Bloom Bails 1975 Bloom Bails 1975 Bloom Bails 1975 Bloom Bails				
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.		_/		
Walking promotes are districted as the contract of the contrac				
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 \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.				
V English the same and the same				
Was an LCS anayized for this SDG?	1			
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	1			
VI. Regional Quality Assulance and Quality Control				
Were performance evaluation (PE) samples performed?	\Box	1	I	
Were the performance evaluation (PF) samples within the acceptance limits?			1	

LDC #: 2312696 SDG #: <u>See carer</u>

VALIDATION FINDINGS CHECKLIST

Page: 7 of 7
Reviewer: 2nd Rev

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Vertication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were detection limits < RL?				
VIII. Overall assessment of date				and the second second
Overall assessment of data was found to be acceptable.				
IX Field duplicates (4.1)				
Field duplicate pairs were identified in this SDG.	1			
Target analytes were detected in the field duplicates,		_		
X. Field blanks				
Field blanks were identified in this SDG.	1	/		
Target analytes were detected in the field blanks.				

231266 LDC#: 23204D6 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer:

Reason Code: be

- NNA NIA Were target analytes detected in the field Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/12/10 Soil factor applied 10x

Were target analytes detected in the field blanks?

Were field blanks identified in this SDG?

METHOD: Inorganics, EPA Method See Cover

Y N N/A

Sample Identification Associated Samples: 3 - 5 Noguals $\overline{\mathrm{EB}}$ Sampling date: 4/12/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other: **Action Limit** 0.84 EB-04122019-RIG2-RZC (SDG#: 280-2352-2) Blank ID 8.4 Analyte CI04

23/2646

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Page: of Reviewer: CZ

2nd Reviewer:__

Field Blanks

Reason Code: bf Were target analytes detected in the field blanks?

Sampling date: 4/6/10 Soil factor applied 10x Field blank / Rinsate / Other. Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/6/10 Soil factor applied 10x

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

N N/A

Sample Identification Associated Samples: Mogul S:eda **Action Limit** 9.5 FB04062010-RZB (SDG#: 280-2131-72) Blank ID 92 Analyte CI04

8DG# 280COLOR

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer:_ 2nd Reviewer:__ Page:

метнор: Inorganics, EPA Method 3/4, O

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

N/A. Was a matrix spike analyzed for each matrix in this SDG? N N/A

Were matrix spike percent recoveries (%R) within the control limits of (75-125?) If the sample concentration exceeded the spike concentration by a factor

of 4 or more, no action was taken.

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

LEVEL IV ONLY:

Y(N) N/A

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Qualifications	J+det/A (m)											
Associated Samples	1000	0-11										
RPD (Limits)			1						·			
MSD %Recovery												
MS %Recovery	136											
II li	Cloy											
Matrix	1,08											
MS/MSD ID	18/19											
#												Ц

Comments:

LDC#: 23126Y6_ SDG#: See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:	of
Reviewer:	3
2nd Reviewer:	1

Inorganics, Method: See Cover

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

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

	Concentrat	ion (🎜/Kg)				Ovelification		
Analyte	4	5	RPD (≤50)	Difference	Limits	Qualification (Parent only)		
Perchlorate	430	450	5					

V:\FIELD DUPLICATES\FD_inorganic\23126Y6.wpd

	Concentrat	ion (lu g/Kg)				Qualification	
Analyte	6	6 8		Difference	Limits	(Parent only)	
Perchlorate	1.8	2.1	15				

	Concentrat	ion (ug/Kg)				Qualification
Analyte	9	11	RPD (≤50)	Difference	Limits	(Parent only)
Perchlorate	81	130	46			

100 #: 23/2646 806 #: <u>\$60 CO</u>NON

Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

Page: of Reviewer: Of S 2nd Reviewer:__

The correlation coefficient (r) for the calibration of $\bigcirc\bigcirc\bigvee$ was recalculated.Calibration date: $\bigcirc\bigvee\bigcirc\bigcirc\bigcirc\bigcirc$

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

%R = Found X 100

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

Where,

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	and the state of t	s1	-	0.00161			
		s2	2	0.0045	0.999970	0.999451	` .
	· ·	83	22	0.01238)-
	3	s4	10	0.02615			-
	-	s5	20	0.05474			
		se	40	0.1095			
Calibration verification		ICV	30	19.475			
Calibration verification		2	30	1/8/02			>
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._

23/2646 SDG #: SECONOR LDC #:

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Reviewer: 2nd Reviewer:

METHOD: Inorganics, Method Seccored

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

Where, %R = Found x 100

Found =

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

concentration of each analyte in the source. True =

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

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

ii ii S Q

Original sample concentration Duplicate sample concentration

			Tours of	í	Recalculated	Reported	
Sample ID	Type of Analysis	Element	(units)	(units)	%R/RPD	CAR / RPD	Acceptable (Y/N)
<u>{</u>	Laboratory control sample	(
\bigcirc		(0)	0 86000	<u> </u>	001	66	<u> </u>
	Matrix spike sample		(ssr-sr)				
71		:	1721 0	0.109		71	
5	Duplicate sample						
		\rightarrow	6,097 10,0969	0,0969	0,00	92/0)
	•			•	•		

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

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	L	01)	
Reviewer:	0	2		
2nd reviewer:	\neg	$\overline{\sim}$	\overline{z}	_

			2nd reviewe	r:	• .
METHOD: Inorganics, Method	Secoul				
Y N N/A Have results been Y N N/A Are results within	or all questions answered "N". Not app in reported and calculated correctly? the calibrated range of the instrumer limits below the CRQL?	•	are identified as "	N/A".	
Compound (analyte) results for	C\G4 e following equation:	repo	rted with a positiv	ve detect were	,
Concentration = (ANCO-OFFSET) PrepFactor Slape % Suid	Recalculation: (0,07	617) +0.0019 0.0028)10 =	0.11 18	128
70 XV.CI		Reported	Calculated	Acceptable	

#	Sample ID	Analyte	Reported Concentration (XXXIC)	Calculated Concentration	Acceptable (Y/N)
		C104	0.11	0.11	4
					•
					
				i	
-					
				·	
			· · ·		20
				-	
		·			

Note:_					

EDD CHECKLIST

LDC #:_23126

Page: 1_of 1 Reviewer: <u>JE</u> 2nd Reviewer: BC

SDG #: 280-2131-1, 280-2131-5, 280-2131-6, 280-2131-8, 280-2131-9 280-2216-1, 280-2216-2, 280-2216-4, 280-2216-5, 280-2216-6 280-2216-7, 280-2270-1, 280-2270-2, 280-2280-1, 280-2280-2 280-2280-4, 280-2280-5, 280-2280-6, 280-2352-6, 280-2280-7 280-2301-1, 280-2301-3, 280-2301-4, 280-2301-7, 280-2352-1 280-2352-4

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				difficult (1) the state of the
Is there an EDD for the associated Tronox validation report?	X		* 121 O M 6	
II. EDD Qualifier Population	#/AT			
Were all qualifiers from the validation report populated into the EDD?	X	ruskii	1615	
III. EDD Lab Anomalies	l ú	 		
Were EDD anomalies identified?	X			
If yes, were they corrected or documented for the client?	X			See EDD_discrepancy_ form_LDC23126_052810.doc
IV. EDD Delivery	11 1		si le	11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Was the final EDD sent to the client?	X			