

LABORATORY DATA CONSULTANTS, INC.

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Northgate Environmental Management, Inc.

June 4, 2010

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

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

Data Validation

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 5, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23204:

SDG #	<u>action</u>
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280-2131-2, 280-2131-10, 280-2280-8, 280-2352-2, 280-2383-1, 280-2448-12 280-2541-9, 280-2699-4, 280-2771-4

Semivolatiles, Chlorinated Pesticides, Metals, Perchlorate

The data validation was performed under Stage 2B 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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280-2383-1, 280-2448-12, 280-2541-9, 280-2699-4, 280-2771-4

Page: 1 of 1 Reviewer: JE 2nd Reviewer: BC

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?		X	<u> </u> 	
If yes, were they corrected or documented for the client?			X	See EDD_discrepancy_ form_LDC23204_060410.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23204

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 26, 2010

Matrix:

Soil/Water

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-2

Sample Identification

RSAK7-3BPC_FD SSAJ8-01-1BPC_FD FB04062010-RZB

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

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 TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAK7-3BPC_FD	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg
SSAJ8-01-1BPC_FD	Bis(2-ethylhexyl)phthalate	120 ug/Kg	120U ug/Kg

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB04062010-RZB 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		
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	No associated samples in this SDG		
FB-04072010-RZD	4/7/10	Bis (2-ethylhexyl) phthalate	2.2 ug/L	RSAK7-3BPC_FD SSAJ8-01-1BPC_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. Surrogate recoveries (%R) were not within QC limits for RSAK7-3BPC_FD and SSAJ8-01-1BPC_FD. Since the samples were diluted out, no data were qualified.

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 280-2131-2	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

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

	Concentrati	ion (ug/Kg)	200	D.W		
Compound	RSAK7-3BPC_FD	RSAK7-3BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Benzo(b)fluoranthene	30	350U	-	320 (≤360)	-	-

	Concentrati	on (ug/Kg)				
Compound	RSAK7-3BPC_FD	RSAK7-3BPC	RPD (Limits)	Difference (Limits)	Flags	A or P
Bis(2-ethylhexyl)phthalate	140	140	_	0 (≤360)	-	_
Chrysene	54	46	-	8 (≤360)	-	-
Fluoranthene	50	46	-	4 (≤360)	-	-
Octachlorostyrene	5900	5100	8 (≤50)	-	-	-
Phenanthrene	31	23	-	8 (≤360)	-	•
Pyrene	32	28	-	4 (≤360)	-	-
Hexachlorobenzene	34000	27000	23 (≤50)	-	-	-

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

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2131-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-2	RSAK7-3BPC_FD SSAJ8-01-1BPC_FD FB04062010-RZB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2131-2

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2131-2	RSAK7-3BPC_FD	Bis(2-ethylhexyl)phthalate	140U ug/Kg	А	bl
280-2131-2	SSAJ8-01-1BPC_FD	Bis(2-ethylhexyl)phthalate	120U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2131-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson SHEET

LDC #:	23204A2a	VALIDATION COMPLETENESS WORKS
SDG #:	280-2131-2	Stage 2B
Laborator	y: Test America	·

Reviewer: 1 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: 4/66/10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	À	2 KSD rr
IV.	Continuing calibration/ICV	<u> </u>	COV/10 = 25 b
V.	Blanks	SM	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	Client Spec US/p
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	*	,
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	Å	D - 2 + SSATE-01-1BPC.
XVI.	Field duplicates	WZ	$D_1 = 2 + SSAJ8-01-1BPC > from 280-2131-1$ $D_1 = 1 + RSAK7-3BPC > from 280-2131-1$ $FB = 3 FB-04072610 - RZD (780-2216-2)$
XVII.	Field blanks	SM)	FB = 3 FB-04072610 - KZD (280-2216-2

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

			- · · · ·				
1 > F	RSAK7-3BPC_FD \$	11		21		31	
2 7	SSAJ8-01-1BPC_FD	12		22		32	
3] F	FB04062010-RZB W	13		23		33	
4 7	MB 286-10308/1-A	14		24		34	
5	MB 286-10308/1-A MB 280-10271/1-A	15		25	·	35	`
6	,	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

A. Pheno!**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol™	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	ດດກ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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VALIDATION FINDINGS WORKSHEET Blanks

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Page:	Reviewer:	2nd Reviewer:

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? N/A Y /N N/A

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

A/N N X

V

(88) Sample Identification Associated Samples: 2 3 **4** NB 280-10308/-A 81.9 Blank ID **EFF** Compound Conc. units: 115

date:	
llysis	
Blank analysis date:	
Blar	
date:	
extra	:
Blank extraction	•

Conc. units:		Associated Samples:
Compound	Blank ID	

5x Phthalates 2x all others

LDC#: 73 204 Ava

SDG #:__

VALIDATION FINDINGS WORKSHEET

Page:__

2nd Reviewer: Reviewer:

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Method 8270C)	
EPA SW 846	
DD: GC/MS BNA (EPA SW 846 Method	
) D: G	٧/-

Were target compounds detected in the field blanks?

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

Blank units: work Associated sample units: water Sampling date: 4/05/10

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amples:	Sample Identification			-			eu.
Associated Samples:	, o						
Other:				٨			
k) Rinsate / (
ie) F(eld Blan	Blank ID	ላ	2.7				
Sampling date: 4/05/10 Field blank type: (circle one) F(eld Blank) Rinsate / Other:	Compound		EFE				
Sampling d Field blank	Col						CROL

Blank units: 4/6/1/6 Associated sample units: 4/6/kg

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

Associated Samples:

Sample Identification A L X ٨ FB-04072010-RZD Blank ID y EFF Compound

5x Phthalates 2x All others

CROL

LDC# 23204 AVA

See Core

VALIDATION FINDINGS WORKSHEET

Page: 1 of 1

Reviewer 2nd Reviewer:

Surrogate Recovery

Qualifications 2 2 15 %R (Limits) 0 Surrogate Sample ID 20×) Sex (Sex) Date #

QC Limits (Water)	10-123	33-110*	16-110*
QC Limits (Soil)	19-122	20-130*	20-130*
SS (2ED)= 2.Elinoranhenol	S6 (TBP) = 2,4,6-Tribromophenol	S7 (2CP) = 2-Chlorophenol-d4	S8 (DCB) = 1,2-Dichlorobenzene-d4
OC Limits (Water)	43-116	33-141	10-94
QC Limits (Soil)	30-115	18-137	24-113
* QC limits are advisory	\$2 (FBP) = 2-Fluorobiphenyl	S3 (TPH) = Terphenyl-d14	S4 (PHL) = Phenol-d5

LDC#: 23204A2a SDG#:See cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:	<u> </u>
Reviewer:	11/6
2nd Reviewer:	

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

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

Were target analytes detected in the field duplicate pairs?

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

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

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:

Water

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-2

Sample Identification

EB-04122010-RIG1-RZB

EB-04122010-RIG2-RZC

EB-04122010-RIG3-RZD

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 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.

Samples EB-04122010-RIG1-RZB, EB-04122010-RIG2-RZC, and EB-04122010-RIG3-RZD 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-RIG1-RZB	4/12/10	Bis(2-ethylhexyl)phthalate	2.3 ug/L	No associated samples in this SDG
EB-04122010-RIG3-RZD	4/12/10	Bis (2-ethylhexyl) phthalate	2.3 ug/L	No associated samples in this SDG

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) 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 280-2352-2	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 280-2352-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2352-2	EB-04122010-RIG1-RZB EB-04122010-RIG2-RZC EB-04122010-RIG3-RZD	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2352-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2352-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 2320		ON COMPLETENESS WORKSHEET
SDG #: 280-	-2352-2	Stage 2B
Laboratory: Tes	at America	_

Date:	125 ho
Page:_	<u>lof_1</u>
Reviewer:_	_JVL_
2nd Reviewer:_	<u>~~</u>

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 / 12/10
	GC/MS Instrument performance check	A	
III.	Initial calibration	Α	2 RSD 17
IV.	Continuing calibration/ICV	A	CW/W = 253
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	Ŋ	Client Spec US /D
VIII.	Laboratory control samples	A	us /p
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	À	
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	SN)	EB = 1 2 3

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

⊁ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

WAter

1	EB-04122010-RIG1-RZB	11	21	31	
2	EB-0412201 6 -RIG2-RZC	12	22	32	
3	EB-0412201 9 -RIG3-RZD	13	23	33	
4	MB 280-10933/1-A	14	24	34	
5	, ,	15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38_	
9		19	29	39	
10		20	30	40	

Dag	<u>ر</u> ک
73204	7
LDC #:_	SDG #:

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

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

Blank units: No / L Associated sample units: NA

Sampling date:

	VALIDATION FINDINGS WORKSHEET	Page: of /
SDG #: JOY (Pro)	Field Blanks	Reviewer. WZ
		2nd Reviewer:
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)		
Y N N/A Were field blanks identified in this SDG?		

None	no					
amples:	Sample Identification					
Associated Samples:	S					
- 1						Ph the late
ier. EB) ph +
/ Rinsate / Oth	1 0 119	3	2,3			EFF = bis (2-cth.) hexy
يران e) Field Blank	Blank ID	_	2,3			bis (2-e
Sampling date: 4/12/10 Field blank type: (circle one) Field Blank / Rinsate / Other.	Compound		4 £ £			
Sam Fielc						CROL

	L		 	L_
ilon				
ample Identifica				
S				
Blank ID				
Compound				
	Blank ID	Compound Blank ID Sample Identification		

Associated sample units:

Blank units:

5x Phthalates 2x All others

CRal

73204 Dra Lee Corre LDC#:

SDG#:

VALIDATION FINDINGS WORKSHEET

of

Page:

Reviewer: 2nd Reviewer:

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)

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

Y(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?

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Qualifications	No qual (ally int)																							
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	51-120																							
%R (Limits)	0.5))))))))))))))))))))))	
															-									
Surrogate	スキャ																						-	
Sample ID	2																							
Date							-																	
#																								
}							-																	i.i

QC Limits (Water) 21-100 10-123 33-110* 16-110*

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

S5 (2FP)= 2-Fluorophenol S6 (TBP) = 2,4,6-Tribromophenol S7 (2CP) = 2-Chlorophenol-44 S8 (DCB) = 1,2-Dichlorobenzene-44

QC Limits (Water) 35-114

QC Limits (Soil) 23-120

* QC limits are advisory

43-116 33-141 10-94

30-115 18-137 24-113

S1 (NBZ) = Nitrobenzene-d5 S2 (FBP) = 2-Fluorobipheny S3 (TPH) = Terpheny-d14 S4 (PHL) = Phenol-d5

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:

Water

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2383-1

Sample Identification

EB-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 (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 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	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 280-2383-1	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2383-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)	
280-2383-1	EB-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 280-2383-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2383-1

No Sample Data Qualified in this SDG

Tronox Northaate Henderson

_DC #:23204E2a	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2383-1	Stage 2B
_aboratory: Test America	

	Date:	5/	25	10
	Page:_	<u> </u>	of_	1
	Reviewer:		3	4
2nd	Reviewer:		6	

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: 4/6 & /ro
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 KSD 12
IV.	Continuing calibration/ICV	À	many con/101 625?
V	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	Client Spec ICS by
IX.	Regional Quality Assurance and Quality Control	N	
X	Internal standards	<u> </u>	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB =)

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	EB-04072010-RZC	11	21	31	
2	MB 280-11077/4-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# 23 204 E24 SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: Page:

2nd Reviewer:

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

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

∠ Associated sample units:
_ Blank units: 100 Y N N/A

Sampling date:

Associated Samples: Sampling date: 4 68 /h. Field blank type: (circle one) Field Blank / Rinsate / Other:

Compound	Blank ID			Sa	Sample Identification	ilon		
EFE	2,4							
tete = b	12-64	ETT = bis (2-ethy) hery) phthalale	Te	-				
CRQL		<u> </u>						

Associated sample units: Blank units:

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

Associated Samples:

ijon					
Sample Identification				·	
Š					
			:		
Blank ID					
Compound					
Сотр					CRQL

5x Phthalates 2x All others

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-12

Sample Identification

SSAL2-01-4BPC SSAL2-01-4BPCMS

SSAL2-01-4BPCMSD

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 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 280-2448-12	All TCL compounds	15	14	J- (all detects) UJ (all non-detects)	P

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

II. GC/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
MB280-13080/1-A	4/29/10	Bis(2-ethylhexyl)phthalate	58.1 ug/Kg	All samples in SDG 280-2448-12

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
SSAL2-01-4BPC	Bis(2-ethylhexyl)phthalate	79 ug/Kg	79U ug/Kg

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples	
FB-04072010-RZD	4/7/10	Bis (2-ethylhexyl) phthalate	2.2 ug/L	All samples in SDG 280-2448-12	

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-12	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2448-12

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2448-12	SSAL2-01-4BPC	All TCL compounds	J- (all detects) UJ (all non-detects)	Α	Technical holding times (h)
280-2448-12	SSAL2-01-4BPC	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 280-2448-12

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2448-12	SSAL2-01-4BPC	Bis(2-ethylhexyl)phthalate	79U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2448-12

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:	23204F2a	VALIDATION COMPLETENS
SDG #:	280-2448-12	Stage 2B
Laborato	ry: Test America	

Reviewer: 2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 4 /14 /ro
II.	GC/MS Instrument performance check	A	
Ш.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	A	ca ha = 25).
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	ICS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A_	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = F60407 2010 - 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

Validated Samples:

021

	301		4.1.		
1	SSAL2-01-4BPC	11	21	31	
2	SSAL2-01-4BPCMS	12	22	32	
3	SSAL2-01-4BPCMSD	13	23	33	
4	MB 280-13080/1-A	14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

VALIDATION FINDINGS WORKSHEET

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

A. 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	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.
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.

LDC #:	12204	
SDG #:_	200	Come

VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page:	of
Reviewer:_	2/6
2nd Reviewer:	1

All circled dates have exceeded the technical holding times.

	MS BNA (EPA	T		Т		7	
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qu
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TECHNICAL HOLDING TIME CRITERIA

Water:

Extracted within 7 days, analyzed within 40 days.

Soil:

Extracted within 14 days, analyzed within 40 days.

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VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer:_____

Blanks

Y N N/A Was a method blank analyzed for each matrix? Y N N/A Was a method blank analyzed for each concentra Y N N/A Was a method blank associated with every sample Y N N/A Was the blank contaminated? If yes, please see q Blank extraction date: 4 /24 /n Conc. units: 89 /k4 Compound Blank ID Blank ID	Was a method blank analyzed for each matrix? Was a method blank analyzed for each concentration preparation level? Was a method blank associated with every sample? Was the blank contaminated? If yes, please see qualification below. In date: 4/24/n Blank analysis date: 4/30/n Associated Samples: Associated Samples: Associated Samples:	(0)
c aw	MB 280-18080/-A	

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28:

EFE

Blank analysis date:

Blank extraction date:_

5x Phthalates 2x all others

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LDC #:_	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

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Lage:	Reviewer:	2nd Reviewer:

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

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

Were target compounds detected in the field blanks?

Work Associated sample units: 4/67/46 Blank units:

Sampling date: 4 / 67 / 10
Field blank type: (circle one) Field Blank / Rinsate / Other. Sampling date:

Sample Identification Associated Samples: X FB-04672010-RZD 4. Blank ID 万万 Compound CRQL

Associated sample units:	
ink units:	

Sampling date: Field Blank / Rinsate / Other:

Associated Samples:

din type: (circle off	y i iciu Dialiik	rieid Dialin Lype. (Circle Oile) i ieid Dialin / Inilipate / Otiel.		Associated Calliples:	pica.			
Compound	Blank ID		;	Samp	Sample Identification	_		
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200-1								

5x Phthalates 2x All others

LDC#: 23 264 F2A See Corre SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of Reviewer: 2nd Reviewer:

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

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. Y N/A

Y/N N/A

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?

					MS	MSD	Ogg () Cogg	Accordated Samples	Qualifications
#	Date	MS/MSD ID	Compound	10/	Y (LIMITS)	Zar (Entities)	LATE (EIIIIIS)	Second and a second	
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	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
₹	Phenol	76-90%	~32%	12-110%	< 42%	99	Acenaphthene	31-137%	< 19%	46-118%	< 31%
ن	2-Chlorophenol	25-102%	%0g >	27-123%	< 40%	Ξ.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
шi	1,4-Dichlorobenzene	28-104%	~2Z <i>></i>	36-97%	< 28%	X X	KK. 2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
ح.	N-Nitroso-di-n-propylamine	41-126%	%8E >	41-116%	< 38%	Ή.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
ď	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	72	Pyrene	35-142%	< 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 16, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2541-9

Sample Identification

SSAJ6-01-7BPC SSAJ6-01-7BPCMS SSAJ6-01-7BPCMSD

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
MB280-12911/1-A	4/28/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-2541-9

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
SSAJ6-01-7BPC	Bis(2-ethylhexyl)phthalate	98 ug/Kg	98U ug/Kg

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2541-9

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MSD percent recovery (%R) and MS/MSD relative percent differences (RPD) were not within QC limits for some compounds, the MS or MSD 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 280-2541-9	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2541-9

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2541-9	SSAJ6-01-7BPC	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 280-2541-9

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2541-9	SSAJ6-01-7BPC	Bis(2-ethylhexyl)phthalate	98U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2541-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23204G2a VALIDATION COMPLETENE
SDG #: 280-2541-9 Stage 2B
Laboratory: Test America

Date: 5/25/10
Page: lof l
Reviewer: V(
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 /16 /16
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD 12 CCV/101 € 257,
IV.	Continuing calibration/ICV	A	CCV/101 = 257
V.	Blanks	WZ_	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A Sw	
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N 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	Ŋ	
XVII.	Field blanks	SW	FB = FB-04072016-RZD (280-2216-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil

	2011			 	
1	SSAJ6-01-7BPC	11	21	31	
2	SSAJ6-01-7BPCMS	12	22	32	
3	SSAJ6-01-7BPCMSD	13	23	33	
4	MB 280-12911 /1-A	14	24	34	
5	,	15	25	35	·
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

VALIDATION FINDINGS WORKSHEET

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

A. 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'-0xybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC, Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	III. 1,4. Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	uuu. Octachlure styrme
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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23204	4
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

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Page:	Reviewer:_	2nd Reviewer:

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

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

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

A/N N/A Y/N N/A

Associated Samples: Was the blank contaminated? If yes, please see qualification below. In date: $4/38/\hbar_0$ Blank analysis date: $4/30/\hbar_0$ Blank extraction date: 4

(17)	7 2 2	ion						
		Sample Identification						
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juanneanon below.	Associated Samples:							
see quaimea	Associat			W/8P	/			
sis date: 4			2911 K-A					
Blank analv		Blank ID	A-711001-085 3M	42.7				
N N/A Was the digit containing in yes, prease see of Blank extraction date: 4/26/1/20 Blank analysis date: 4/26/1/20	Conc. units: $v_{\rm S}/k_{\rm C}$	Compound		FEE				
Blank e	Conc. L							

Blank analysis date:	Associated
date	
slank extraction date:	onc. units:
lank	onc.

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5x Phthalates 2x all others

LDC#: 73 204 6 29 SDG #:

VALIDATION FINDINGS WORKSHEET

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

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

Blank units: 45 / Associated commit

101/20 Sampling date:_

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

= Associated Samples:

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Sample Identification		T B J				
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	310-R ZD					
Blank ID	PB-04073010-RZD	2,5				
Compound		3.3.3				SROL

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

Associated Samples:

Compound	Blank ID		Š	Sample Identification	tion		
CROL							

5x Phthalates 2x All others

LDC#: 03204 G29 2,66 SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 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".

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?

) *	Date	QI QSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	ts)	Associated Samples	Qualifications
		2/3	SS	()	- 49) (25 (1 06		No just (nsim
		/	ททท	())) 39 (, A		(MS/KSD in
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	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)
Ą	Phenol	78-90%	< 35%	12-110%	< 42%	99	Acenaphthene	31-137%	< 19%	46-118%	<31%
ن	2-Chlorophenol	25-102%	%05 >	27-123%	< 40%	=	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
шi	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	ξ.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
ر.	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%	Z.	Pyrene	35-142%	× 36%	26-127%	< 31%
>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 21, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2699-4

Sample Identification

RSAJ5-9BPC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (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
MB280-12911/1-A	4/28/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-2699-4

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

Sample	Compound	Reported	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
RSAJ5-9BPC	Bis(2-ethylhexyl)phthalate	75 ug/Kg	75U ug/Kg

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

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

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2699-4	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2699-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2699-4	RSAJ5-9BPC	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2699-4

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2699-4	RSAJ5-9BPC	Bis(2-ethylhexyl)phthalate	75U ug/Kg	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2699-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B Laboratory: Test America

	Date: 5/26 /10
	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
l.	Technical holding times	Ä	Sampling dates: + /21 /10
II.	GC/MS Instrument performance check	À	
H1.	Initial calibration	A	2 KSD Y
IV.	Continuing calibration/ICV	A	2 RSb r ~ cw/10 = 252
V.	Blanks	SM	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Ŋ	client spec
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ZN)	FB = FB-04672010-RZD (280-246-2)

Note: A = Acceptable

LDC #: 23204H2a

SDG #: 280-2699-4

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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	>0				
1	RSAJ5-9BPC	11	21	31	
2	MB 280-12911 1-A	12	22	32	
3		13	23	33	
4		14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene⁺
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF, 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz (a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ, Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
i. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC, Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA, 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກກກ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	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 Blanks

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Page: Reviewer:	- CANCIACI

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

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

Was a method blank associated with every sample?

Was the blank contaminated? If yes, please see qualification below. Slank extraction date: # /28/10 Blank analysis date: # /30/10

 (γq) Sample Identification /**૨**૦ /ાંગ Associated Samples: MB 260-129 11/A Blank ID 52.7 加出 Compound Conc. units:

Blank analysis date: Blank extraction date:

Associated Samples:

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Sample Identification				
Š		2		٠
Blank ID				
Compound				

5x Phthalates 2x all others

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Reviewer: 2nd Reviewer:	Jof Jof	≫	5
	Page:	Reviewer:	2nd Reviewer:

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

Sampling date:_

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

17 Associated Samples:

Compound	Blank ID	Sample Identification	
	179-1407	FB-04072010- RZD	
433	3.2	(84 ×2 <)	
CROL			

sample units:	
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Associated Samples:

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Sample Identification					
S					
Blank ID	3000000				
Compound Blani					
Comp					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 22, 2010

LDC Report Date:

May 26, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-4

Sample Identification

SSAM2-01-3BPC

SSAM2-01-4BPC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Method Blank ID	Extraction Compound Date TIC (RT in minutes)		Concentration	Associated Samples
MB280-12911/1-A	4/28/10	Bis(2-ethylhexyl)phthalate	62.7 ug/Kg	All samples in SDG 280-2771-4

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SSAM2-01-3BPC	Bis(2-ethylhexyl)phthalate	100 ug/Kg	100U ug/Kg
SSAM2-01-4BPC	Bis(2-ethylhexyl)phthalate	89 ug/Kg	89U ug/Kg

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) was identified as a field blank. No semivolatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	All samples in SDG 280-2771-4

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2771-4	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2771-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2771-4	SSAM2-01-3BPC SSAM2-01-4BPC	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 280-2771-4

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2771-4	SSAM2-01-3BPC	Bis(2-ethylhexyl)phthalate	100U ug/Kg	А	bl
280-2771-4	SSAM2-01-4BPC	Bis(2-ethylhexyl)phthalate	89U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2771-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23204|2a VALIDATION COMPLETENESS V
SDG #: 280-2771-4 Stage 2B
Laboratory: Test America

Date: 5/26/ro
Page: _ of _
Reviewer: _ \mathcal{N} 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
I.	Technical holding times	<u> </u>	Sampling dates: 4 /2> /ID
11.	GC/MS instrument performance check	A -	'
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	Ă	cala =x3
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	Α	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	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	W2	FB = FB - 04/32010-RIG2-RZE (280-2410-

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

,	>011					
1	SSAM2-01-3BPC	11	21	3	31	
2	SSAM2-01-4BPC	12	22	3	32	
3	MB 280-12911 /-A	13	23	3	33	
4	/	14	24	3	34	790 cap
5		15	25		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**	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-Chioro-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	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ກດດ
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

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VALIDATION FINDINGS WORKSHEET Blanks

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Page:	Reviewer:	2nd Reviewer:

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

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

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

// V $\frac{\rm Y~N./A}{\rm Blank}$ Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $\frac{4}{3}/28/_{\odot}$ Blank analysis date: $\frac{4}{3}/30/_{\odot}$

Conc. units: M6//c		Associated Samples: #1/	
Compound	Blank ID		
	MB 286-	MB 286- 2914-A 1 2	
343		100 / 10 80 / 10	
	433	EEE = bis (2-ethy) hoxy) ph thalate	

date:_	
alysis	
Blank analysis date:	
Bla	
date:	
Blank extraction date:	i
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Blan	Section Company

	ification				
	Sample identification				
Associated Samples.					
Associa					
	Blank ID				
	Compound				
Conc. units:					

5x Phthalates 2x all others

LDC#: 73-204 IN SDG #: Soc Corr

VALIDATION FINDINGS WORKSHEET Field Blanks

_of	25	
Page:	Reviewer:	2nd Reviewer:

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

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

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

Blank units: VG / Associated sample units: VG / ES

Sampling date: (12 / D

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

= \ Sample Identification £ Associated Samples: X \wedge 5 ND FB-04132010-RIGZ-RZE Blank ID _ **EFE** FFF Compound CROL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

Field blank type: (circle one) Field Blank / Rinsate / Other:	ie) Field Blank	/ Rinsate / Othe	er:	Ass	Associated Samples:	nples:			
Compound	Blank ID				Sam	Sample Identification	lon		
CROL									

5x Phthalates 2x All others

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23204

Chlorinated Pesticides



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:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-2

Sample Identification

FB04062010-RZB

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 FB04062010-RZB 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) 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 280-2131-2	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2131-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2131-2	FB04062010-RZB	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 280-2131-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2131-2

No Sample Data Qualified in this SDG

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	Tronox Northgate Henderson
LDC #: 23204A3a	VALIDATION COMPLETENESS WORKSHEE
SDG #: 280-2131-2	Stage 2B
Laboratory: Test America	

Date:_	5/26/
Page: 1	_of_
Reviewer:_	JVC
2nd Reviewer:_	5

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: \$ /66 /10
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	Lx
IV.	Continuing calibration/ICV	Jon 1	CCV/60 = 20 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec 1CS
VIII.	Laboratory control samples	A	rcs
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	7	
XV.	Field blanks	ND	FB = 1

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:

WKACK

	1.101-4		 	 	
1	FB04062010-RZB	11	21	31	
2	MB 280 - 10305/1-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	

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23204

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 24, 2010

Matrix:

Soil/Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-2

Sample Identification

RSAK7-3BPC_FD FB04062010-RZB FB04062010-RZBMS FB04062010-RZBMSD

Introduction

This data review covers one soil sample and 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, Lead, Magnesium, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cobalt	0.0110 ug/L	All water samples in SDG 280-2131-2

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
FB04062010-RZB	Cobalt	0.023 ug/L	1.0U ug/L

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB04062010-RZB 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
FB04062010-RZB	4/6/10	Cobalt Manganese Magnesium	0.023 ug/L 2.6 ug/L 31 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 280-2131-2	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 RSAK7-3BPC_FD and RSAK7-3BPC (from SDG 280-2131-1) were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)		BBB	Diff		
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 280-2131-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-2	RSAK7-3BPC_FD FB04062010-RZB	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 280-2131-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2131-2	FB04062010-RZB	Cobalt	1.0U ug/L	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2131-2

No Sample Data Qualified in this SDG

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LDC #: 23204A4	_ VALIDATION COMPLETENESS WORKSH
SDG #: 280-2131-2	_ Stage 2B
Laboratory: Test America	

Date: 5-24-10
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2nd Reviewer: \(\subseteq \text{C} \)

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.

	Validadian Anna		Comments
	Validation Area		Comments
1.	Technical holding times	<u> </u>	Sampling dates: 4/6/10
11.	ICP/MS Tune	0	
Ш.	Calibration	17	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (SOGA 280-2131-1)
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	Notutinized (280-2131-1)
XI.	ICP Serial Dilution	A	(280-2131-1)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1, RSA147-3BPC(SO6x 280-2131-1))
XV	Field Blanks	SW	(1, RSA147-3BPC (506 x 280-2131-1)) FB=Z, FB-0407 ZO10-RZD (506 x ZPO-2Z16-7)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: Soil/Water

1	RSAK7-3BPC_FD	S	11	PBW	21	31
2	FB04062010-RZB	W	12	PBS	22	32
3	FB04062010-RZBMS		13		23	33
4	FB04062010-RZBMSD	V	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 #: 23204A4 SDG #: SEO CONO 2

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
	5	Al, Sb.(As.)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
7	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
(x>34		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cd, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN'
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb, S, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,

Comments:	Mercury by CVAA if performed	 <u> </u>	

LDC #: 23204A4 SDG #: See Cover METHOD: Trace me Sample Concentratic	04A4 e Cover race metals	LDC #: 23204A4 SDG #: See Cover METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: ug/L	34 Method 60 therwise not	310B/6020/7 ted:ug/L		VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA Associated Samples: All Water	JALIFIED S ctor applied es: All W	NRKSHEET AMPLES 1: NA ater	(Report b	19.		Page: of Reviewer:	Page: of Reviewer: C
		1						() () () () () () () () () ()					100
Analyte	Maximum PB ^a	Maximum Maximum PB ^a ICB/CCB ^a	Maximum ICB/CCB ^a	Action Limit	2		=						
	(mg/Kg)	(ng/L)	(ng/L)										
රි			0.0110		0.023 / 1.0								

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

LDC #: 23204A4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Field Blank: (bf)

Page: of Reviewer: CC 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?

100x Blank units: ug/L Associated sample units: mg/Kg

No appociand Samples Associated Samples: Field blank type: (circle one)(Field Blank / Rinsate / Other Soil factor applied Sampling date: 4/6/10

		T	T	ī									$\overline{}$	$\overline{}$
								1						
, and a second s														
7														
									i	,				
ion														
Sample Identification														
Sample														
													-	
$\Big)\Big)\Big]$	Action Level		2.6	31										
Blank ID	. 2	0.023	2.6	31										
Analyte		Co	Mn	Mg										

Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U". CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

LDC_23204A4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

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

N NA YN NA

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

	Concentrati	ion (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Analyte	1	RSAK7-3BPC (SDG#: 280-2131-1)	RPD	Difference	Limits	(Parent Only)
Arsenic	5.8	6.2	7			

V:\FIELD DUPLICATES\FD_inorganic\23204A4.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 24, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-10

Sample Identification

SA51-4BPC

SA51-4BPCMS

SA51-4BPCMSD

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 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.
- Part 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 280-2131-10	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 280-2131-10

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-10	SA51-4BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2131-10

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2131-10

No Sample Data Qualified in this SDG

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LDC #:	23204B4	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2131-10	Stage 2B
Laborator	y: Test America	

Date: 5-24-10
Page:of
Reviewer:
2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	<u>A</u>	Sampling dates: 4/6/10
II.	ICP/MS Tune	A	,
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MSD
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	À	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Notutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	FB=FB-04072010-RZC

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (2%0-2280-2) D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>				 	
1	SA51-4BPC	11	GBS .	21	31	
2	SA51-4BPCMS	12		22	32	
3	SA51-4BPCMSD	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 8, 2010

LDC Report Date:

May 24, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-8

Sample Identification

SSAO6-05-4BPC SSAO6-05-4BPCMS SSAO6-05-4BPCMSD

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 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) was identified as a field blank. No arsenic was found in this blank.

Sample EB-04072010-RZC (from SDG 280-2383-1) was identified as an equipment blank. No arsenic was found in this blank.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 280-2280-8	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2280-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-8	SSAO6-05-4BPC	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 280-2280-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2280-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2280-8

No Sample Data Qualified in this SDG

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LDC #:	23204C4	VALIDATION COMPLETENESS WORKSHEE
SDG #:	280-2280-8	_ Stage 2B
Laborator	y: Test America	

Date: 5-24-10)
Page: <u> (</u> of <u> \</u>	
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
١.	Technical holding times	A	Sampling dates: 4/8/10
	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	B	
VI.	Matrix Spike Analysis	A	m5/D
VII.	Duplicate Sample Analysis	$\dot{\wedge}$	1
VIII.	Laboratory Control Samples (LCS)	17	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\sim	Notutilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$ \mathcal{N} $	
XV	Field Blanks	NO	FB=FB-04072010-RZC EB=EB-04072010-RZC
lote:	A = Acceptable ND = N		(280-2383-1)

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

d D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

						
1	SSAO6-05-4BPC	11	PBS	21		31
2	SSAO6-05-4BPCMS	12		22		32
3	SSAO6-05-4BPCMSD	13		23	-	33
4		14		24	3	34
5		15		25		35
6		16		26	3	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:

June 2, 2010

Matrix:

Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-2

Sample Identification

EB-04122010-RIG1-RZB

EB-04122010-RIG2-RZC

EB-04122010-RIG3-RZD

EB-04122010-RIG1-RZBMS

EB-04122010-RIG1-RZBMSD

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, Magnesium, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobalt	0.0139 ug/L	All samples in SDG 280-2352-2

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-04122010-RIG1-RZB	Cobalt	0.037 ug/L	1.0U ug/L
EB-04122010-RIG2-RZC	Cobalt	0.11 ug/L	1.0U ug/L
EB-04122010-RIG3-RZD	Cobalt	0.015 ug/L	1.0U ug/L

Samples EB-04122010-RIG1-RZB, EB-04122010-RIG2-RZC, and EB-04122010-RIG3-RZD were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples	
EB-04122010-RIG1-RZB	4/12/10	Cobalt Manganese Magnesium	0.037 ug/L 4.4 ug/L 8.7 ug/L	No associated samples in this SDG	
EB-04122010-RIG2-RZC 4/12/10		Cobalt Manganese Magnesium	0.11 ug/L 16 ug/L 59 ug/L	No associated samples in this SDG	
EB-04122010-RIG3-RZD 4/12/10		Cobalt Manganese Magnesium	0.015 ug/L 0.66 ug/L 6.6 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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
EB-04122010-RIG1-RZBMS/MSD (EB-04122010-RIG1-RZB)	Manganese	143 (75-125)	-	-	J+ (all detects)	А

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2352-2	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2352-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2352-2	EB-04122010-RIG1-RZB	Manganese	J+ (all detects)	А	Matrix spike/Matrix spike duplicates (%R) (m)
280-2352-2	EB-04122010-RIG1-RZB EB-04122010-RIG2-RZC EB-04122010-RIG3-RZD	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 280-2352-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2352-2	EB-04122010-RIG1-RZB	Cobalt	1.0U ug/L	А	bl
280-2352-2	EB-04122010-RIG2-RZC	Cobalt	1.0U ug/L	А	ld
280-2352-2	EB-04122010-RIG3-RZD	Cobalt	1.0U ug/L	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2352-2

No Sample Data Qualified in this SDG

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	Hollox Northgate Heliacison
DC #: 23204D4	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2352-2	_ Stage 2B
_aboratory: <u>Test America</u>	

Page: of \
Reviewer: cc 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: 4/17/10
· II.	ICP/MS Tune	M	
10.	Calibration	17	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MSD
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	1
X.	Furnace Atomic Absorption QC	\wedge	Notutinzed
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	B	
XIV.	Field Duplicates	$ \mathcal{N} $	
XV	Field Blanks	SW	EB=1,2,3 cno associa 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:

Water

	0000				 	
1	EB-04122010-RIG1-RZB	11	POW	21	31	
2	EB-0412201 9 RIG2-RZC	12		22	32	
3	EB-0412201 0 -RIG3-RZD	13		23	33	
4	EB-04122010-RIG1-RZBMS	14		24	34	
5	EB-04122010-RIG1-RZBMSD	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 #: 2320-D-1 SDG #: Seo caro?

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		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,
0145		Al, Sb (As, Ba, Be, Cd, Ca, Cr, Cò, Cu, Fe, Pb, Mg, Mn) Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
~)/ 		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni; K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ .
		Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni. K. Se. Ag. Na, Tl. V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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 ⁻ ,
		Analysis Method
ICP		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,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb,(As) Ba, Be, Cd, Ca, Cr,(Co), Cu, Fe,(Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments:	Mercury by CVAA if performed	

LDC #: 23204D4
SDG #: See Cover
METHOD: Trace me

Page: \ of \ Reviewer: \ CAZ Reason: h) VALIDATION FINDINGS WORKSHEET PRICEICES OUTLIFIED SAMPLES

SDG #: See Cover	e Cover					PB/ICB/CC	SCOALIFIE	PB/ICB/CCB QUALIFIED SAMPLES	-1	d d	State of the	•	(L'EWEWE!	
METHOD:	METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)	(EPA SW 86	34 Method 60	10B/6020/7	_	Soil preparation factor applied: NA	n factor ap	plied: NA	1				Zn	2nd Reviewer:_	\cdot
Sample Coi	Sample Concentration units, unless otherwise noted: ug/L	nits, unless o	otherwise not	ed: ug/L		Associated Samples: All Water	mples: A	II Water							
Analyte	Maximum PB³ (mg/Kg)	Maximum PB ^a (ug/L)	Maximum Maximum PB ^a ICB/CCB ^a (ug/L)	Action Limit	-	2	Е							-	
రి			0.0139		0.037 / 1.0	.037 / 1.0 0.11 / 1.0 0.015 / 1.0	0.015 / 1.0								- 1

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

LDC #: 23204D4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

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

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

Were target analytes detected in the field blanks?

Field Blank: (bx)

100x Soil factor applied _ Sampling date: 4/12/10

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

Associated Samples: M QQQoc, ated SampleD Sample Identification Action Level 4.4 Blank ID 0.037 4.4 8.7 Analyte ξ βg ပိ

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 #: 23204D4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: 1

Field Blank: (be)

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?

100x Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/12/10 Soil factor applied

EB) Sampling date: 4/12/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other.

Associated Samples: NO OLO ACCICHO SAMOLE Sample Identification Action Level 16 29 Blank ID 0.11 16 59 2 Analyte ပိ 돌 Ĭ

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".

SDG #: See Cover LDC #: 23204D4

VALIDATION FINDINGS WORKSHEET Field Blanks

2nd Reviewer:

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

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

Were target analytes detected in the field blanks?

100x Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/12/10

Associated Samples: No apportant Samples Field blank type: (circle one) Field Blank / Rinsate / Other. Soil factor applied

Field Blank: (be)

											9		
ation				-									
Sample Identification													
Š													
													1
	Action Level												1
Blank ID		0.015	0.66	6.6	to the second se								
Analyte		ပိ	Min	Mg									

Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U". CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

10c# 23204/DH SDG# 58020201

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125) If the sample concentration exceeded the spike concentration by a factor Y N/A

of 4 or more, no action was taken.

Were all duplicate sample relative percent differences (RPD(≤20%) or water samples and ≤35% for soil samples?

LEVELIV ONLY:
Y N(N)

Y N/A

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Stdot/A (m)	No Qualisier (us in)							
Associated Samples								
RPD (Limits)	52							
MSD %Recovery								
MS %Recovery I \(\frac{3}{3}								
Analyte M	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\							
Matrix LD401	Mater							
OI OSWISM	415							

Comments:

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): 280-2383-1

Sample Identification

EB-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 6020 for Metals. The metals analyzed were Arsenic, Cobalt, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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	0.0139 ug/L	All samples in SDG 280-2383-1

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	Analyte	Reported Concentration	Modified Final Concentration
EB-04072010-RZC	Cobalt	0.093 ug/L	1.0U ug/L

Sample EB-04072010-RZC was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04072010-RZC	4/8/10	Cobalt Manganese	0.093 ug/L 15 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 not within QC limits. Since there were no associated samples, no data were qualified.

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 280-2383-1	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2383-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2383-1	EB-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 280-2383-1

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2383-1	EB-04072010-RZC	Cobalt	1.0U ug/L	А	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2383-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 5-24-16
Page: of Reviewer:
Reviewer: _ 🔾 -
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

23204E4

Laboratory: Test America

280-2383-1

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.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
, V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MB/D (506 x 280-2352-2)
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\sim	Notulited
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	I A	
XIV.	Field Duplicates	$ \mathcal{N} $,
XV	Field Blanks	SW	EB=1 (no associated samples)

Note:

LDC #:_

SDG #:

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

	WORD				
1	EB-04072010-RZC	11	PBN	21	31
2		12	7	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:		
The state of the s		

LDC#: <u>6) (0 72)</u> SDG#: <u>SEO COVE</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	5 /	Al, Sb(As), Ba, Be, Cd, Ca, Cr(Co), Cu, Fe, Pb, Mg(Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
-		
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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>	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	·	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ion		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	<u> </u>	Al Sb As Ba Be Cd Ca Cr Co Cu Fe Pb Mg Mn Hg Ni K Se Ag Na Tl V Zn Mo B Si CN

Comments:_	Mercury by CVAA if performed		

LDC #: <u>23204E4</u>
SDG #: <u>See Cover</u>
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ua/L

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

Page: of Reviewer: CO

METHOD: Trace met Sample Concentratio Analyte Maximu PB" (mg/K)	METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: ug/L Analyte Maximum Maximum Maximum Action PB* (ug/L) (ug/L)	race metals (EPA SW 864 Method 6 centration units, unless otherwise no Maximum PB* (ug/L) (ug/L) (ug/L)	54 Method 60 otherwise not Maximum ICB/CCB* (ug/L)	ed: ug/L ed: Limit	-	Soil preparation factor applied: NA Associated Samples: All Water	mples:	All Water			2nd Reviewer:	§ - -
ć			0.0139		0.093 / 1							

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

LDC #: 23204E4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: _of _ Reviewer: _C_ 2nd Reviewer:

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

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

Were target analytes detected in the field blanks?

Field Blank: (be)

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

EB) Field blank type: (circle one) Field Blank / Rinsate / Other Soil factor applied Sampling date: 4/8/10

Associated Samples: NO ODDOCIONE OSOMO) PO Sample Identification Action Level 5 Blank ID 0.093 5 Analyte M ပိ

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".

spe # Second LDC#_23204£4

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer: 2nd Reviewer:

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

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

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-12)? If the sample concentration exceeded the spike concentration by a factor Y N/A

of 4 or more, no action was taken.

Were all duplicate sample relative percent differences (RPD $\sqrt{2}$ sor water samples and 235% for soil samples?

Y M N/A Wer

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

					 		 		 						 	_			
the state of the s	Qualifications	No Qualifiera																	
	Associated Samples	None	7																
	RPD (Limits)		25		i														
	MSD %Recovery																		
	MS %Recovery	=		The state of the s															
	Analyte	M	Mn																
	Matrix	31-1826 WAR																	
	-	18-04122010-928-RZB UDAR																	
	#	<u> </u>				<u> </u>	 <u>L</u>	<u></u>	 <u> </u>	<u> </u>	<u> </u>	1	<u> </u>	<u> </u>	 <u> </u>	<u>L</u>	<u> </u>	<u></u>	<u>Ц</u>

Comments:

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23204

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:

Water

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-2

Sample Identification

FB04062010-RZB

FB04062010-RZBMS

FB04062010-RZBMSD

FB04062010-RZBDUP

Introduction

This data review covers 4 water samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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 FB04062010-RZB was identified as a field blank. No perchlorate was found in this blank with the following exceptions:

Sampling Field Blank ID Date		Analyte	Concentration	Associated Samples		
FB04062010-RZB	4/06/10	Perchlorate	92 ug/L	No associated samples in this SDG		

IV. Matrix Spike/Matrix Spike Duplicates

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

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 280-2131-2	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2131-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-2	FB04062010-RZB	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2131-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2131-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23204A6 **V**SDG #: 280-2131-2
Laboratory: <u>Test America</u>

Stage 2B

Date: \$5/24	l IC
Page: Lof L	
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
I.	Technical holding times	M	Sampling dates: 4/6/10
lla.	Initial calibration	0	
IIb.	Calibration verification	Ò	
101.	Blanks	8	
IV	Matrix Spike/Matrix Spike Duplicates	A	M_2/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A,	·
IX.	Field duplicates	\mathcal{N}	
X	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:

	War					
1	FB04062010-RZB	11	8BW	21	31	
2	FB04062010-RZBMS	12		22	 32	
3	FB04062010-RZBMSD	13		23	33	
4	FB04062010-RZBDUP	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: CC

2nd Reviewer:

Field Blanks

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

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 Y N N/A

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

Reason Code: bf

Associated Samples: Nd appaciated Samples Sample Identification **Action Limit** 9.2 Blank ID 92 Analyte CIO4

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 12, 2010

LDC Report Date:

June 2, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2352-2

Sample Identification

EB-04122010-RIG1-RZB

EB-04122010-RIG2-RZC

EB-04122010-RIG3-RZD

Introduction

This data review covers 3 water samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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 attRZButable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attRZButable 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. 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 were identified as equipment blanks. No perchlorate were 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	No associated samples in this SDG	

IV. 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.

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 280-2352-2	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2352-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2352-2	EB-04122010-RIG1-RZB EB-04122010-RIG2-RZC EB-04122010-RIG3-RZD	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2352-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2352-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23204D6 VALIDATION COMPLETENESS VI SDG #: 280-2352-2 Stage 2B Laboratory: Test America Page: of 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: 4/17/10
IIa.	Initial calibration	P	
Ilb.	Calibration verification	Ŕ	
Ш.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	. L
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	· N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	5W	EB=1, Z, 3 (no appociated samples)

Note:

A = Acceptable

SW = See worksheet

N = Not provided/applicable

ND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>				 	
1	EB-04122010-RIG1-RZB	11	PBN	21	31	
2	0 EB-0412201 9 -RIG2-RZC	12		22	32	
3	EB-04122019-RIG3-RZD	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 #: 23204D6

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: 2nd Reviewer: Page.

METHOD: Inorganics, EPA Method See Cover

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 Soil factor applied 10x Sampling date: 4/12/10

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

Associated Samples: NO ADOL'GRO SampleS Reason Code: be

				ı			
							
	0.84						
2	8.4						
	2104						
	2	1 0.84	8.4 0.84	8.4 0.84	8.4 0.84	8.4 0.84	8.4 0.84

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:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2383-1

Sample Identification

EB-04072010-RZC

Introduction

This data review covers 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 X.

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. 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 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	4/08/10	Perchlorate	1.2 ug/L	No associated samples in this SDG

IV. 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.

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 280-2383-1	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 280-2383-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)	
280-2383-1	EB-04072010-RZC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (sp)	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2383-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2383-1

No Sample Data Qualified in this SDG

SDG # Labora	: 23204E6 t: 280-2383-1 atory: Test America OD: (Analyte) Perchl	LIDATIO	N COMI	PLET Stage	ENE	lendersor ESS WOR		Date 24 Page: _of Reviewer: _\frac{1}{2}		
The sa		e revie				ng va	alidation area	as. Validatio	n find	dings are noted in attached
	Validation	Area	2 1		T		-10-1-10-1	, Comm	ents	
1.	Technical holding times	73.44		IA	Samp	lina d	ates: 4/8	10		
IIa.	Initial calibration			A		<u>-</u>				
IIb.	Calibration verification			0						
111.	Blanks			A						
IV	Matrix Spike/Matrix Spike D	uplicat	es	N	Cli	en	tspec	ified)	
V	Duplicates			N		`				
VI.	Laboratory control samples			0	LC	5/	D			
VII.	Sample result verification			N						
VIII.	Overall assessment of data			A						
IX.	Field duplicates			N_{\perp}						1
X	Field blanks		· · · · · · · ·	<u> ISW</u>	E6	3-,	040720	10-1		no associated samples
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet)	R = Rir	lo compoun nsate ield blank	ds detec	eted		plicate rip blank quipment blan	k	•)
Validate	ed Samples:	-								
1	EB-04072010-RZC	11	PBh	/		21			31	
2		12				22			32	·
		1					1			

1	EB-04072010-RZC	11	PBW	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:			

SDG #: See Cover LDC #: 23204E6

VALIDATION FINDINGS WORKSHEET

Page:

2nd Reviewer:_

Field Blanks

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

Were target analytes detected in the field blanks? Y N NA

Reason Code: be

Sampling date: 4/8/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other. Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/8/10 Soil factor applied 10x

Associated Samples: NOCLOCK A HO Sorm DIRD Sample Identification EB **Action Limit** 0.12 Blank ID 7 Analyte CI04