

LABORATORY DATA CONSULTANTS, INC.

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

Northgate Environmental Management, Inc. 1100 Quail Street Ste. 102 Newport Beach, CA 92660 ATTN: Ms. Cindy Arnold June 10, 2010

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 27, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23252:

<u>SDG #</u>

Fraction

280-2216-9, 280-2301-8, 280-2400-2 280-2400-9, 280-2448-13, 280-2771-1 280-2836-1, 280-2879-1, 280-2931-2 280-2960-1, 280-2995-4, 280-3059-1 Semivolatiles, Chlorinated Pesticides Metals, Perchlorate

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

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

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

Sincerely,

Erlinda T. Rauto Operations Manager/Senior Chemist LDC #: <u>23252</u> SDG #: <u>280-2216-9</u>, <u>280-2301-8</u>, <u>280-2400-2</u>, <u>280-2400-9</u> <u>280-2448-13</u>, <u>280-2771-1</u>, <u>280-2836-1</u>, <u>280-2879-1</u> <u>280-2931-2</u>, <u>280-2960-1</u>, <u>280-2995-4</u>, <u>280-3059-1</u>

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	x			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	x			
III. EDD Lab Anomalies				
Were EDD anomalies identified?		x		
If yes, were they corrected or documented for the client?			x	See EDD_discrepancy_ form_LDC23252_060910.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	x			

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Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23252

Semivolatiles

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 13, 2010

LDC Report Date: June 4, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-2

Sample Identification

FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (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
MB280-11305/1-A	4/16/10	Di-n-octylphthalate	1.65 ug/L	All samples in SDG 280-2400-2

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
FB-04132010-RIG2-RZE	Di-n-octylphthalate	1.6 ug/L	1.6U ug/L
EB-04132010-RIG3-RZD	Di-n-octylphthalate	1.6 ug/L	1.6U ug/L

Sample EB-04132010-RIG3-RZD was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB-04132010-RIG3-RZD	4/13/10	Di-n-octylphthalate	1.6 ug/L	No associated samples in this SDG

Sample FB-04132010-RIG2-RZE 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	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 280-2400-2	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2400-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2400-2	FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2400-2

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-2400-2	FB-04132010-RIG2-RZE	Di-n-octylphthalate	1.6U ug/L	A	bl
280-2400-2	EB-04132010-RIG3-RZD	Di-n-octylphthalate	1.6U ug/L	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-2400-2 Laboratory: Test America

23252C2a

LDC #:

Date: 1/12/16 Page: 1 of / Reviewer: 10 2nd Reviewer: 10

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

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4 /13 /10
11.	GC/MS Instrument performance check	A	
].	Initial calibration	A	2 RSD IT
IV.	Continuing calibration/ICV	A	Ca/100 6252
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	chient spec
VIII.	Laboratory control samples	A	client spec us 10
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVL	Field duplicates	N	
XVII.	Field blanks	SW	FB = tB = r

Note:

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

Validated Samples:

WATEr

1	FB-04132010-RIG2-RZE	+ 11	MB 280- 11305/1-A	21	31	
2	EB-04132010-RIG3-RZD	12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

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

VALIDATION FINDINGS WORKSHEET

	D Dio(2)-201	EE 3 6. Dinitratelucero	TT Dastachlocochlatt	III Banzo(a)nurenatt
	r. Dis(z-ciiloloeuloxy)methane			ui. Deito(a)Pyreite
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-Dinitrophenoi*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol⁺	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP, Benzoic Acid
I. 4-Methylphenol	X. Hexachiorocyclopentadiene*	MM. 4-Chlorophenyi-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzył alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	nu
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

26 Page: _____of__ 2nd Reviewer: Reviewer:

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

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

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?

<u>Y N N/A</u> Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 4/4, /w Blank analysis date: 4/26 /w <u>X N N/A</u> X N N/A Y N N/A

Conc. units: UG

A U Associated Samples:

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Sample Identification						
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		1.6 /W	,			
	305A-A					
Blank ID	MP 280-11 305 AM	1.65				
		144				
Compound						

Blank analysis date: Blank extraction date:

Conc. units:

Sample Identification Blank ID Compound

Associated Samples:

5x Phthalates 2x all others

BLANKS2tronox.wpd

100 A 201

SDG #: Sc. Correction 846 Method 8270C) METHOD: GC/MS BNA (EPA SW 846 Method 8270C) Y N N/A Were field blanks identified in this SDG? Y N N/A Were target compounds detected in the f					VALIDATION FINDINGS WURNSHEET		Page:	e:
METHOD: GC/MS BNA (EPA SW 8- Y N N/A Y N Were field blanks ide Y N N/A			ш)	Field Blanks			Parl Doviewer:	er. Me
Blank units: 109 /L Associated	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the field by // Associated sample units: NA	270C) is SDG? d in the fielc ts: NA	d blanks?					5
Sampling date: <u> </u>	Blank / Rins:	ate / Other:_		Associate	Associated Samples:	hone		
Compound FB	(ID B/k	4			Sample Identification	ation		
		۲ ا						
I'I AAA								
FFF 1.6	-	6						
				-				
CRAL								
	Associated sample units:	ts:						
Sampling uate: Field blank type: (circle one) Field Blank / Rinsate / Other.	Blank / Rins	ate / Other:		Associate	Associated Samples:			
Compound Blank ID	Ū,			1	Sample Identification	ation		
CRAL								

5x Phthalates 2x All others

FBLKASC2tronox.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 27, 2010

LDC Report Date: June 4, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2931-2

Sample Identification

SSAK3-05-1BPC

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	All samples in SDG 280-2931-2

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2931-2	All compounds reported below the PQL.	J (all detects)	А

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2931-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2931-2	SSAK3-05-1BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

0

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-2931-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2931-2

No Sample Data Qualified in this SDG

Tronox Northgate	Henc	lerson
VALIDATION COMPLETE	NESS	WORKSHEET

LDC #: 23252I2a

Stage 28 4

280-2931-2 SDG #: Laboratory: Test America

Page: 1of) Reviewer: N6 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
Ι.	Technical holding times	A	Sampling dates: 4/27/10
П.	GC/MS Instrument performance check	A	
Ш.	Initial calibration	A	$\frac{2}{C} \frac{1}{K} \frac{1}$
IV.	Continuing calibration/ICV	A	$c\omega/i\omega = 252$
V.	Blanks	A	
VI.	Surrogate spikes	<u> </u>	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	Client Spec KS
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
Xi.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	RZFB=FB-04072010- RZD (280-2216-7)

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:

vallua	Soil				
4 1	SSAK3-05-1BPC	11	21	31	
2	MB 280 - 13357/1-A	12	22	32	
3	/	13	23	33	
4		14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

000

Date: 6 /6 - ho

Method: Semivolatiles (EPA SW 846 Method 8270C)

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

SVOA-SW_2.wpd version 2.0

VALIDATION FINDINGS CHECKLIST

	Pa	ge:_	20	of_	2
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Reviewer: 2nd Reviewer:

Validation Area	Yes	> No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internal standards		r r	0.00	
Were internal standard area counts within -50% or +100% of the associated calibration standard?	/			
Were retention times within + 30 seconds from the associated calibration standard?		ľ		
XI. Target compound identification		1	1	
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	(
Did compound spectra meet specified EPA "Functional Guidelines" criteria?		1		
Were chromatogram peaks verified and accounted for?				Gentle
XII. Compound quantitation/CRQLs	/		ti i i i I	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	1			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)	4			
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance				
System performance was found to be acceptable.		ł		
XV Overall assessment of data in the				
		r	T	
Overall assessment of data was found to be acceptable.				
XVI:Field duplicates			1	
Field duplicate pairs were identified in this SDG.	ļ			
Target compounds were detected in the field duplicates.				K
XVII. Field blanks		T	T	
Field blanks were identified in this SDG.	<u> </u>	<u> </u>	 	
Target compounds were detected in the field blanks.	<u> </u>		<u> </u>	

LDC #:	73 Z	.52	İna
SDG #:	Sce	Cove	<u> </u>

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-Chioroaniline	ll. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	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**	nn
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

COMPNDL

LDC #: 12 K2 I2K			VALIDATI	ION FINDI	LIDATION FINDINGS WORKSHEET	KSHEET		Pa	Page: 1 of 1	-1
SDG #: <u>در ر</u> مب				Field E	<u>Field Blanks</u>			Reviewer:		ł
METHOD: GC/MS BNA (EPA SW 846 Method 8270C) Y N N/A Were field blanks identified in this SDC Y N N/A Were target compounds detected in th Blank units: いうんAssociated sample units:	A SW 846 Mé blanks identifie t compounds d	MS BNA (EPA SW 846 Method 8270C) Were field blanks identified in this SDG? Were target compounds detected in the field blanks? More target compounds detected in the field blanks?	field blanks?	~				Znd Reviev	wer	1
Sampling date: 4/07/0 Field blank type: (circle one) Field Blank/ Rinsate / Other:	R Field Blank	Cinsate / Oth	ier:		Associated Samples:	amples:	A 1]			
Compound	Blank ID				S.	Sample Identification	lon			
	FB-04672910-	(12 Y - 01								<u></u>
EFF	7.2		×15 2)	× FB)						
										-
										<u> </u>
										و = شت
CRQL										
Blank units: Ass	Associated sample units:	le units:								
Sampling date:	e) Field Blank	/ Rinsate / Oth	er:		Associated Samples:	amnles:				
	Diank ID				Ŭ	and don't foot			والمحافظ المحافظ والمحافظ والم	
hillion										

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73 VS Ind LDC #:

Associated Valiptes.	ation				
Jai 10100.	Sample Identification				
עססטרומוכר י					
ובל ו ובות הומו	Blank ID				
IBIO DIBILIK () De. (CIICLE OLIE) I IEIO DIBILIK / INIIDARE / CIIEI.	Compound				
רופות הומווע ה	Com				

5x Phthalates 2x All others

CRQL

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1 2nd Reviewer: Reviewer:

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

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

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

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

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

X = Mean of the RRFs

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

		_				
Area IS	262046	997667	671030	1219394	1513952	1309806
Area cpd	220464	1381644	1155733	394826	2008107	1958223
Inc IS/Cpd	40/50	40/50	40/50	40/50	40/50	40/50

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.6984	1.0908	1.2935		1.0330	0.9394
10.00	0.7499	1.0730	1.1667	0.2303	0.9982	1.0100
20.00	0.6512	1.0585	1.2453	0.2289	1.0104	1.0839
50.00	0.6731	1.1079	1.3779	0.2590	1.0611	1.1960
80.00	0.6228	1.1000	1.3843	0.2562	1.0602	1.2099
120.00	0.6766	1.1473	1.4242	0.2854	1.0752	1.3098
160.00	0.6887	1.1741	1.4888	0.3029	1.0741	1.3626
200.00	0.6937	1.2114	1.5224	0.3306	0.9470	1.3565
×	0.6818	1.1204	1.3629	0.2705	1.0324	1.1835
S II	0.0371	0.0527	0.1212	0.0378	0.0449	0.1597

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

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LDC # フォンイン よって SDG # <u>See Cover</u>

VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page / of / Reviewer: <u>W</u>

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

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

Where:

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

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

Ax = Area of compound Ais = Are. Cx = Concentration of compound Cis = Con

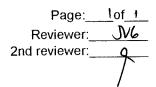
Ais = Area of associated internal standard Cis = Concentration of internal standard

		-						
	Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
Standard ID	Date	Compound (Reference IS)	IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	۵%
D4531	05/01/10	1,4-Dioxane	(IS1)	0.6818	0.6135	0.6135	10.0	10.0
		Naphthalene	(IS2)	1.1204	1.1479	1.1479	2.5	2.5
		Fluorene	(IS3)	1.3629	1.4115	1.4115	3.6	3.6
		Hexachlorobenzene	(IS4)	0.2705	0.2804	0.2804	3.7	3.7
		Chrysene	(IS5)	1.0324	1.0668	1.0668	3.3	3.3
		Benzo(a)pyrene	(186)	1.1835	1.2509	1.2509	5.7	5.7

Compound (Reference IS)	()	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	384024	312973
Naphthalene	(IS2)	40/80	2646759	1152826
Fluorene	(IS3)	40/80	2305108	816564
Hexachlorobenzene	(IS4)	40/80	809868	1444254
Chrysene	(IS5)	40/80	3940883	1847115
Benzo(a)pyrene	(186)	40/80	3862774	1543947

LDC #: 3252 Ira SDG #: Ste Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification



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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	81.2	81	81	0
2-Fluorobiphenyl		77.1	77	77	
Terphenyl-d14		98.9	99	99	
Phenol-d5	10	129.0	86	86	
2-Fluorophenol		119.7	80	80	
2,4,6-Tribromophenol		106.9	7/	71	<
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

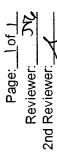
	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobipheny!					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

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LDC #:	SDG #

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

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

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration SA = Spike added

LPD = 1 LCSC - LCSDC 1 * 2/(LCSC + LCSDC) LCSC =

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

LCS/LCSD samples: 1(5 - 35 - 5) + 57/2 - 4

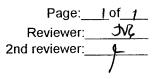
Covery Percent Recovery RPI Recalc Reported Reported 84 84 84		4 5	ke	ŝ	ike		CS SS	Ü	csD		CS/I CSD
ICA U.CSD ICA U.CSD Reported Renair Reported o-di-r-prop/amile C ICA ICA ICA ICA Reported Reported o-di-r-prop/amile C ICA ICA ICA ICA ICA o-di-r-prop/amile C ICA ICA ICA Reported Reported o-di-r-prop/amile Z ICA ICA ICA ICA ICA Interest Z ICA ICA ICA ICA ICA Interest Z ICA ICA ICA ICA Interest Z ICA ICA ICA Interest Z ICA ICA ICA Interes ICA ICA ICA	Compound	P A A A	ded /)		htration Act	Percent R	ecovery	Percent R	ecovery	R	Q
o-diri-propylamine $o-diri-propylamine$ $o-diri-propylamine$ $o-diri-propylamine$ $o-diri-propylamine$ $2-510$ kA $2-3-methylphenol$ $2-5510$ kA $2-5510$ kA 2140 kA $2-5510$ kA 2140 kA $2-5510$ kA 2790 k 2750 j 7790 j $0100phenol$ 2750 j 919		l CS	0 1 CSD	I CS	U LCSD	Reported	Recalc.	Reported	Recalc	Reported	Recalculated
o-di-n-propylamine o -di-n-propylamine o -di-n-propylamine o -di-n-propylamine o -di-n-propylamine 2 -s d -n-propylamine 2 -s </td <td>Phenol</td> <td></td>	Phenol										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	N-Nitroso-di-n-propylamine										
there 2.560 kA 2140 kA 84 locophenol 2.560 J 7.300 f 99	4-Chloro-3-methytphenol										
Icrophenol 2760 J 7730 J 99	Acenaphthene	260	1rA	2140	KA KA	84	84				
2560 1 3530 4 99	Pentachiorophenol										
	Pyrene	2560		2530	~	66	66				
						-					

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

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LDC #:	つうレ	52	Т	26
SDG #:				

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification



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

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

Concen	tration	$= \frac{(A_{y})(I_{y})(V_{t})(DF)(2.0)}{(A_{ts})(RRF)(V_{y})(V_{s})(%S)}$	Example:
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D
A _{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	
l _s	=	Amount of internal standard added in nanograms (ng)	$Conc. = (80668)(40)$ $(131247)^{(0.2705)}$
V _°	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V,	æ	Volume of extract injected in microliters (ul)	= 304.0
V	=	Volume of the concentrated extract in microliters (ul)	
Df	=	Dilution Factor.	~ 300 ug/
%S	=	Percent solids, applicable to soil and solid matrices only.	

22 $\frac{\partial}{\partial (1m/)(1mv)}$

2.0 = Factor of 2 to account for GPC cleanup

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

Laboratory Data Consultants, Inc. Data Validation Report

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

April 28, 2010

LDC Report Date: June 4, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2995-4

Sample Identification

Collection Date:

SSAN6-07-3BPC SSAN6-07-4BPC**

**Indicates sample underwent Stage 4 review

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-4	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

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

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-2995-4

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2995-4	SSAN6-07-3BPC SSAN6-07-4BPC**	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 280-2995-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-2995-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-2995-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson	
VALIDATION COMPLETENESS WORKSHE	ΞT
Stage 2B/4	

280-2995-4 SDG #:_

23252K2a

Laboratory: Test America

LDC #:

Date: 6/0 2/10 lof 1 Page: Reviewer: NG 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 /28 /10
11.	GC/MS Instrument performance check	Å	
111.	Initial calibration	A	2 RSD NY
IV.	Continuing calibration/ICV	A	$c_{\alpha}/i_{\alpha} \leq 252$
V.	Blanks	A	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	A	Client SSAQ 3-01-7BPC
VIII.	Laboratory control samples	A	Les
IX.	Regional Quality Assurance and Quality Control	N	
Х.	Internal standards	A	
XI.	Target compound identification	Aк	
XII.	Compound quantitation/CRQLs	N A	
XIII.	Tentatively identified compounds (TICs)	N .	
XIV.	System performance	NA	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FO = FB-04072010-RZC (280-2780-2)

Note:

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

So

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples: + + unliv

1	SSAN6-07-3BPC	11	21		31	
2	SSAN6-07-4BPC	12	22		32	
3	MB 280-13949/21-	13	23		33	
4	/	14	24	· · · · · · · · · · · · · · · · · · ·	34	
5		15	25		35	
6		16	26		36	
7		17	27		37	
8		18	28		38	
9		19	29		39	
10		20	30		40	

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Method: Semivolatiles (EPA SW 846 Method 8270C)

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

2nd Reviewer:

Validation Area	Yes	No	NA	/ Findings/Comments
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			[
Were the performance evaluation (PE) samples within the acceptance limits?				Í
X. Internal standards		4.2.2		
Were internal standard area counts within -50% or +100% of the associated calibration standard?	/			
Were retention times within ± 30 seconds from the associated calibration standard?	/			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs			9. SP	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/	2		
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TICs)	-			
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	-
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			/	(
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/	-	
XIV. System performance				
System performance was found to be acceptable.				
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	$\left[\right]$			
XVI: Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.		-		
XVII. Field blanks				
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene⁺⁺
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene≁	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethyiphthalate	AAA. Butyibenzyiphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenoł	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-othylhexyl)phthalate	TTT. 1,4- Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di⊷n-octylphthalate**	uuu, octachiorostyrene
N. 2-Nitrophenoi**	CC. Dimethyiphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	vw.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachiorobenzene	HHH. Benzo(k)fluor a nthene	·mmm

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

COMPNDL

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

X l of Page: Reviewer: 2nd Reviewer:

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

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

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

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

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

X = Mean of the RRFs

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

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

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00		1.1191	1.4337		1.1603	1.0624
10.00	0.7200	1.0315	1.4006	0.1914	1.1208	1.0548
20.00	0.7128	1.0652	1.3863	0.1995	1.1246	1.1138
50.00	0.6700	1.0419	1.3468	0.1996	1.0651	1.1462
80.00	0.6540	0.9915	1.2886	0.2021	1.0538	1.1452
120.00	0.6579	0.9413	1.2601	0.1897	0.9907	1.1311
160.00	0.6321	0.9206	1.1894	0.1905	0.9596	1.1027
200.00	0.6558	0.8811	1.1406	0.1897	0.9324	1.0775
<u> </u>	0.6718	0666.0	1.3058	0.1946	1.0509	1.1042
	0.0325	0.0803	0.1047	0.0055	0.0832	0.0362

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

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LDC # <u>~~~~~</u> 大 ~~ SDG # <u>See Cover</u>

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

2 Page ____ of ___ Reviewer: 2nd Reviewer: .

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

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

Where:

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

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

Ax = Area of compound

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

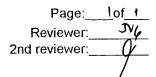
			Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
	#	Standard ID	Date	Compound	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	U %
	-	Y2041	05/05/10	1,4-Dioxane	(IS1)	0.6718	0.6326	0.6326	5.8	5.8
1				Naphthalene	e (IS2)	0666.0	0.9901	0.9901	0.9	0.9
				Fluorene	(IS3)	1.3058	1.2805	1.2805	1.9	1.9
<u> </u>				Hexachlorobenzene	cenzene (IS4)	0.1947	0.1995	0.1995	2.5	2.5
1				Chrysene	(185)	1.0509	1.0427	1.0427	0.8	0.8
1				Benzo(a)pyrene	ene (IS6)	1.1042	1.1500	1.1500	4.1	4.1
1										
<u>!</u>										
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Ľ				Contraction of the second se						

Compound (Reference IS)	(9	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	529970	418891
Naphthalene	(IS2)	40/80	3249540	1640967
Fluorene	(IS3)	40/80	2525517	986110
Hexachiorobenzene	(IS4)	40/80	667483	1672491
Chrysene	(185)	40/80	3658447	1754242
Benzo(a)pyrene	(186)	40/80	3746932	1629142

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LDC #: 325~ Kre SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification



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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	197	67.0	67	67	0
2-Fluorobiphenyl		69.2	69	6'9	
Terphenyl-d14	F F	83.5	83	83	
Phenol-d5	150	109.7	73	73	
2-Fluorophenol		104.1	<u>Lg</u>	69	
2,4,6-Tribromophenol	ł	126.3	84	84	X
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

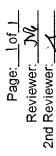
Sample ID:_____

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

Sample ID:

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

	Labo
LDC #: 2325-75-26	SDG #: See Conr



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

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

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration SA = Spike added

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

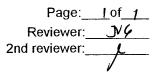
LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280- 139 49/22-A

Compound Addad Concentration Ics (MS, Ac, b) (MS, Ac, b) Phenol . Ics (MS, Ac, b) Phenol . . . N-Nitroso-di-n-propylamine . . . 4-Chloro-3-methylphenol . . . Acenaphthene 2.5.3.0 NA 1776 Pertachlorophenol . . . Pyrene . . .		Spi	ke l	Š	ike		CS		CSD		LCS/LCSD
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Compound	ppv)	led ()	Concer (VK	Action	Percent F	Percent Recovery	Percent Recovery	tecovery	RI	RPD
o-di-n-propylamine o-di-n-propylamine -3-methylphenol -3-methylphenol 2.530 NA 1776 Intree 1.776 1.8770 1.77000 1.7700 1.77000 1.7700		1 CS	U LCSD			Reported	Recalc	Reported	Recalc	Reported	Recalculated
o-di-n-propylamine o-di-n-propylamine -3-methylphenol 15.30 NA In In In In In In In In In In	enol										
-3-methylphenol 1 2530 AA 1 lorophenol 3530 A	Nitroso-di-n-propylamine										
thene 2530 AA L lorophenol 7530 A	Chloro-3-methylphenol										
lorophenol 7530	enaphthene	2530	4Y	176	42	2۵	<i>Q</i>				
×30	intachlorophenol										
		X30	-+	1870		74	p/				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of gualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 23252 Km SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification



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

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

Example:

Conce	entratio	n = <u>(A,)(I,)(V,)(DF)(2.0)</u> (A _s)(RRF)(V ₀)(V _i)(%S)
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured
A _{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
l _s	=	Arnount of internal standard added in nanograms (ng)
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V,	=	Volume of extract injected in microliters (ul)
V,	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Sample I.D. # V SS $Conc. = \frac{(85337)(40)(1m/)(1m7)(}{(134737)(0.1447)(30.39)(0.924)(})$ = 465.6 ~ 470 ug/kg

Factor of 2 to account for GPC cleanup 2.0 =

#	Sample ID	Compound	Reported Concentration	Calculated Concentration	Qualification
			<u>/</u> _	<u>/</u> _	
	Ale 1997				

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 29, 2010

LDC Report Date: June 4, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-1

Sample Identification

SSAQ3-01-1BPC SSAQ3-01-3BPC SSAQ3-01-5BPC SSAQ3-01-7BPC SSAQ3-01-9BPC** SSAQ3-01-7BPCMS SSAQ3-01-7BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-3059-1

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3059-1	All compounds reported below the PQL.	J (all detects)	Α

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

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

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3059-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3059-1	SSAQ3-01-1BPC SSAQ3-01-3BPC SSAQ3-01-5BPC SSAQ3-01-7BPC SSAQ3-01-9BPC**	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3059-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-3059-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3059-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson	
ALIDATION COMPLETENESS WORKSHEE	r
Stage 2B/4	

LDC #:_ 23252L2a SDG #: 280-3059-1

Laboratory: Test America

Date: 6/02/10 Page: 1of] Reviewer: 2nd Reviewer

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

V

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4/29/10
١١.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 ksp r [×]
IV.	Continuing calibration/ICV	A	CON/IN = 252
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB 04062010-RZB (from 280-2/31-2)

Note:

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

Soil

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples: ** Level 4

1	SSAQ3-01-1BPC	11	MB 280 - 13949 A-A	21	31
2	SSAQ3-01-3BPC	12	, 	22	32
3	SSAQ3-01-5BPC	13		23	33
4	SSAQ3-01-7BPC	14		24	34
5	SSAQ3-01-9BPC **	15		25	35
6	SSAQ3-01-7BPCMS	16		26	36
7	SSAQ3-01-7BPCMSD	17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

23252 L2g LDC #: See Cover

Construction of the second

SDG #:_

Page: 1 of 2 Reviewer: 3 Ть 2nd Reviewer:

2

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times				
All technical holding times were met.	\square			
Cooler temperature criteria was met.			All surger	
II. GC/MS Instrument performance check			l	
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
III. Initial calibration		r V	<u>)</u>	
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	\leq	ł 	<u> </u>	
Was a curve fit used for evaluation?		 		
Did the initial calibration meet the curve fit acceptance criteria of \geq 0.990?		1	<u> </u>	
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?		Ł		
TV. Continuing calibration	1	<u>ل</u>	1	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?		1		
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) \leq 25% and relative response factors (RRF) \geq 0.05?				
V. Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?		1	 	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/	Ĺ	
VI-Surrogate spikes				
Were all surrogate %R within QC limits?	arproductorial	 	 	
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?				Ľ
VII. Matrix spike/Matrix spike duplicates		1	T	
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?	\downarrow	1	_	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		ł		
VIII. Laboratory control samples		T - 2		
Was an LCS analyzed for this SDG?		K		

VALIDATION FINDINGS CHECKLIST

Reviewer:	\mathcal{N}
2nd Reviewer:	Ŷ

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

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

VALIDATION FINDINGS WORKSHEET

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

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

COMPNDL

LDC #: کې ک د کر احم	VALIDATION FINDINGS WORKSHEET	Page: 1 of 1
SDG #: Src Corr	Field Blanks	Reviewer: <u>W</u> 2nd Reviewer:
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)Y N N/AWere field blanks identified in this SDG?Y N N/AWere target compounds detected in the field blanks?Blank units:WMathematical in the field blanks?	roc) s SDG? in the field blanks?	
Sampling date: 7.6 / 0 Field blank type: (circle one) Field Blank/ Rinsate / Other:	te / Other: Associated Samples: A I	
Compound Blank ID	Sample Identification	
15		
EEE 2.7	$(ND \land \forall SX \#)$	
CROL		
Blank units: Associated sample units:		
Field blank type: (circle one) Field Blank / Rinsate / Other:	te / Other: Associated Samples:	
Compound Blank ID	Sample Identification	
CROL		
5x Phthalates 2x All others		

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VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

× ______ Page: __ Reviewer: 2nd Reviewer:

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

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

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

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

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

X = Mean of the RRFs

# Standard 1 ICAL	<u> </u>	Calibration		I vehot red				500000	
# Stands 1 IC/				RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
1 IC/		Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)		
		5/4/2010	5/4/2010 1,4-Dioxane (IS1)	0.6700	0.6700	0.6718	0.6718	4.8	4.84
Y SSM	Ţ		Naphthalene (IS2)	1.0419	1.0419	0666.0	0.9990	8.0	8.04
			Fluorene (IS3)	1.3468	1.3468	1.3058	1.3058	8.0	8.02
			Hexachlorobenzene (IS4)	0.1996	0.1996	0.1947	0.1946	2.8	2.82
			Chrysene (IS5)	1.0651	1.0651	1.0509	1.0509	7.9	7.92
-			Benzo(a)pyrene (IS6)	1.1462	1.1462	1.1042	1.1042	3.3	3.28
		, # ,							

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

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00		1.1191	1.4337		1.1603	1.0624
10.00	0.7200	1.0315	1.4006	0.1914	1.1208	1.0548
20.00	0.7128	1.0652	1.3863	0.1995	1.1246	1.1138
50.00	0.6700	1.0419	1.3468	0.1996	1.0651	1.1462
80.00	0.6540	0.9915	1.2886	0.2021	1.0538	1.1452
120.00	0.6579	0.9413	1.2601	0.1897	0.9907	1.1311
160.00	0.6321	0.9206	1.1894	0.1905	0.9596	1.1027
200.00	0.6558	0.8811	1.1406	0.1897	0.9324	1.0775
×	0.6718	0666.0	1.3058	0.1946	1.0509	1.1042
S =	0.0325	0.0803	0.1047	0.0055	0.0832	0.0362

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

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Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

of) Page__ Reviewer. 2nd Reviewer: .

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

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

Where:

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

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

Ax = Area of compound

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

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

Compound (Reference IS)		Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	529970	418891
Naphthalene	(IS2)	40/80	3249540	1640967
Fluorene	(IS3)	40/80	2525517	986110
Hexachlorobenzene	(IS4)	40/80	667483	1672491
Chrysene	(IS5)	40/80	3658447	1754242
Benzo(a)pyrene	(186)	40/80	3746932	1629142

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Reviewer: Page: lof) 2nd Reviewer.

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

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

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

SSC = Spiked sample concentration SA = Spike added

Where:

MS = Matrix spike percent recovery

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MS/MSD samples:

RPD = 1 MS - MSD 1 * 2/(MS + MSD)

MSD = Matrix spike duplicate percent recovery

SC = Sample concentation

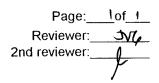
g		Recalculated				4		4			
USM/SM	RPD	Reported				ν		4-			
e Duplicate	kecovery	Recalc				76		6			
Matrix Spike Duplicate	Percent Recovery	Reported				76		e			
Spike	ecovery	Recalc				79		80			
Matrix Spike	Percent Recovery	Reported				62		38			
Sample	tration	MSD				abor		2992			
Spiked (Concentration	WS				2200		2550			
Sample	Concentration (15 / L)	0 ~				a		160			
ke		Ø				2750		2750			
Spi	Added (Le / A)	MS				2770		2770			
	Compound		Phenol	N-Nitroso-di-n-propylamine	4-Chloro-3-methylphenol	Acenaphthene	Pentachiorophenol	Pyrene			

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

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LDC #: 73257 L29 SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification



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

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

% Recovery: SF/SS * 100

5

Where: SF = Surrogate Found SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	(9)	74.1	74	7¢	0
2-Fluorobiphenyl		76.5	76	76	
Terphenyl-d14		89.7	90	90	
Phenol-d5	100	113.4	76	76	
2-Fluorophenol		109.6	73	73	
2,4,6-Tribromophenol		1 32.97	89	89	
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

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LDC #: 42 X 7 L 22	SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET

oratory Control Sample/Laboratory Control Sample Duplicates Results Verification



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

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

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration SA = Spike added

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

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

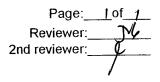
LCS/LCSD samples: US 280 - 139 49 /22-A

	Sp	ike	Sp	ike		CS	Ü	CSD		I CS/I CSD
Compound	PA (Sw)	Added (145 /Ec/)	Conce (145	Concentration (45 / ky)	Percent Recovery	kecovery	Percent Recovery	ecovery	æ	RPD
					Reported	Recalc	Renorted	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2530	K A	170	AA AA	70	70				
Pentachlorophenoi									$\mathbf{\lambda}$	
Pyrene	230		1870		74	74				

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

LDC #: 23257 LZA SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET **Sample Calculation Verification**



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

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

.

Conce	entratio	$n = (A_{,})(I_{,})(V_{,})(DF)(2.0) - (A_{,})(RRF)(V_{,})(%S)$	Example:
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	$c_{000} = (96351)(40)(1ml)(100)(1)$
l,	=	Amount of internal standard added in nanograms (ng)	$Conc. = \frac{(96351)(40)(1m/)(1m0)(}{(1339240)(0.194b)(30.57)(0.928)(})$
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V,	=	Volume of extract injected in microliters (ul)	= 522.5
V,	=	Volume of the concentrated extract in microliters (ul)	a 570 /
Df	=	Dilution Factor.	2 520 mg/kg
%S	=	Percent solids, applicable to soil and solid matrices only.	0
2.0	=	Factor of 2 to account for GPC cleanup	

2.0	= Factor of 2 to accour	t for GPC cleanup		T	
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
				T	
	······				
				· ·	
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	1				

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23252

Chlorinated Pesticides

LDC

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 13, 2010

LDC Report Date: June 4, 2010

Matrix: Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-2

Sample Identification

FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD

V:\LOGIN\TRONOXNG\23252C3A.TR3

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

V. Blanks

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

Sample EB-04132010-RIG3-RZD was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Sample FB-04132010-RIG2-RZE was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
MB280-11682/1-A	Col. 1	Tetrachloro-m-xylene	53 (54-115)	All TCL compounds	J- (all detects) UJ (all non-detects)	Р

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2400-2	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 280-2400-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2400-2	FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Trone	ox Northgate	Henc	lerson	
VALIDATION	COMPLETEN	IESS	WORKSI	HEET

Stage 2B

SDG #: <u>280-2400-2</u>

LDC #: 23252C3a

Laboratory: Test America

Date: 6/62/1. Page: 1 of / Reviewer: <u>JV6</u> 2nd Reviewer: <u></u> METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4 /13 /10
11.	GC/ECD Instrument Performance Check	A	
	Initial calibration	A	r
IV.	Continuing calibration/ICV	A	ca/100 = 202
<u>V</u> .	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Chient Spec US 10
VIII.	Laboratory control samples	A	LCS /b
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	LD	$FB = I EB = \gamma$

Note:

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

Validated Samples:

valida	ated Samples: Wate	(
1	FB-04132010-RIG2-RZE	11	21	31
2	EB-04132010-RIG3-RZD	12	22	32
3	MB 280- 11682/-A	13	23	33
4	/	14	24	34
5		15	25	35
6		16	26	36
7		17	27	37
8		18	28	38
9		19	29	39
10		20	30	40

LDC #: 23252 C34 SDG #: SPC Car

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

200 Page: 1 of 1 Reviewer:__ 2nd Reviewer:

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

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". V N/A Were surrogates spiked into all samples, standards and blanks? V N/N/A Did all surrogate percent recoveries (%R) meet the QC limits?

Y N N/A

	<u> </u>			_			 			<u> </u>	<u> </u>	_			_				6	
Qualifications	ht p																			Comments
%R (Limits)	-I (JI-H) (()	()	()	()	()	()	()	()) (()	()	()	()	()	()	()	()		Recovery QC Limits (Water)
Surrogate Compound	A 53																			Recovery QC Limits (Soil)
Column	CH,																			q
Sample ID	MD 280-11682 AM																			Surrogate Compound
Date																				Letter Designation
#																				

SUR.wpd

Tetrachoro-m-xylene Decachlorobiphenyl

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 22, 2010

LDC Report Date: June 4, 2010

Matrix:

Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-1

Sample Identification

SSAL3-04-1BPC SSAL3-04-3BPC SSAL3-04-5BPC SSAL3-04-7BPC SSAL3-04-9BPC SSAM2-01-1BPC** SSAM2-01-3BPC SSAM2-01-5BPC SSAM2-01-7BPC SSAM2-01-9BPC SSAM2-01-1BPC_FD SSAM2-01-5BPCMS SSAM2-01-5BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 13 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within the QC limits. Since the samples were diluted out, no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

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

XII. Project Quantitation Limit

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

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

Sample	Compound	RPD	Flag	A or P
SSAM2-01-1BPC**	Methoxychlor	193.3	J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2771-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAM2-01-1BPC** and SSAM2-01-1BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	555	D:#		
Compound	SSAM2-01-1BPC**	SSAM2-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	18000	22000	20 (≤50)	-	-	-
4,4'-DDT	19000	17000	11 (≤50)	-	-	-
Dieldrin	300	390	•	90 (≤1900)	-	-
Hexachlorobenzene	2600	3400	-	800 (≤1900)	-	-
Methoxychlor	1000	3700U	-	2700 (≤3700)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2771-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2771-1	SSAM2-01-1BPC**	Methoxychlor	J (all detects)	A	Compound quantitation and CRQLs (RPD) (dc)
280-2771-1	SSAL3-04-1BPC SSAL3-04-3BPC SSAL3-04-5BPC SSAL3-04-7BPC SSAL3-04-9BPC SSAM2-01-1BPC** SSAM2-01-3BPC SSAM2-01-5BPC SSAM2-01-7BPC SSAM2-01-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

LDC #: 23252F3a SDG #: 280-2771-1 Laboratory: Test America

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

	Date:	6/04/10
	Page:_	<u>\of</u>
	Reviewer:	NU
2nd	Reviewer:	() a
		10-

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4 /22 /10
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	À	2 RSD rr
IV.	Continuing calibration/ICV	A	$2 RSD r^{2}$ $cov / iov \leq 20 2$
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	us
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	мŅ	
Xb.	GPC Calibration	N	
XI.	Target compound identification	лкA	
XII.	Compound quantitation and reported CRQLs	NSW	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 6, 11
XV.	Field blanks	ND	FB = FB - 04072010 - R2D (280 - 2216 - Y) f = FB - 04132010 - R2E (280 - 2400 - Y)
Note:	A = Acceptable ND = N	o compound	V = FB - 04 / 1320 / 0 - R2E (280 - 2400 - 2) s detected D = Duplicate

N = Not provided/applicable SW = See worksheet

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

Validated Samples:	
* * Level IV	

.5	0	

* 7	Level IV SC	<u>'/</u>				
1	SSAL3-04-1BPC	11	SSAM2-01-1BPC_FD	D 21	MB 280 - 12472/-A31	
2	SSAL3-04-3BPC	12	SSAM2-01-5BPCMS	22	32	
3	SSAL3-04-5BPC	13	SSAM2-01-5BPCMSD	23	33	
4	SSAL3-04-7BPC	14		24	34	
5	SSAL3-04-9BPC	15		25	35	
6	SSAM2-01-1BPC **	16		26	36	
7	SSAM2-01-3BPC	17		27	37	
8	SSAM2-01-5BPC	18		28	38	
9	SSAM2-01-7BPC	19		29	39	
10	SSAM2-01-9BPC	20		30	40	

73257 F34 LDC #:_ SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

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Page: 1 of 2 Reviewer: <u>TVC</u> 2nd Reviewer:

method. I estadesh obs (El A orr of o method oco need				
Validation Area	Yes	No	NA	Findings/Comments
1 Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	/			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?		~		
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) \leq 20%?		· ·		
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	[/	•		
Did the initial calibration meet the curve fit acceptance criteria?	/			
Were the RT windows properly established?				
Were the required standard concentrations analyzed in the initial calibration?		/		
IV. Continuing calibration	_/			
What type of continuing calibration calculation was performed?%D or%R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	/	1		
Were endrin and 4,4-DDT breakdowns \leq 15% for individual breakdown in the Evaluation mix standards?	/			
Was a continuing calibration analyzed daily?		•		
Were all percent differences (%D) \leq 20% or percent recovieries 80-120%?				
Were all the retention times within the acceptance windows?				
	1			

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

What type of continuing calibration calculation was performed?%D or%R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?		~		
Were endrin and 4,4-DDT breakdowns \leq 15% for individual breakdown in the Evaluation mix standards?				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) \leq 20% or percent recovieries 80-120%?	\square			
Were all the retention times within the acceptance windows?				
V. Blanks	, , , , , ,			
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Were extract cleanup blanks analyzed with every batch requiring clean-up?		,		
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.			,	
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?				
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates	1			

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: ______

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2nd I	Reviewer	($\mathbf{\lambda}$

0				
Validation Area	Yes	No	NA	/ Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
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?			1	
VIII. Laboratory control samples				r
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		/		
IX. Regional Quality Assurance and Quality Control	_/			
Were performance evaluation (PE) samples performed?		/	r	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Target compound identification	r	v	·	
Were the retention times of reported detects within the RT windows?				
XI Compound quantitation/CRQLs			r	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	/			
XII. System performance				
System performance was found to be acceptable.		[
XIII. Overall assessment of data	•			
Overall assessment of data was found to be acceptable.	/			
XIV Field duplicates				
Field duplicate pairs were identified in this SDG.	$\left \right $			
Target compounds were detected in the field duplicates.		1		
XV. Field blanks	1			
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.			/	

LDC # 23 257 F 34 SDG #: Tre Curry

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

lof Page: Reviewer: 2nd Reviewer:

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

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". \overrightarrow{V} N/A Were surrogates spiked into all samples, standards and blanks? \overrightarrow{V} Did all surrogate percent recoveries (%R) meet the QC limits?

<u>YNNA</u>

Qualifications %R (Limits) Surrogate Compound Column Sample ID Date #

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			A) 0111) (
)	(
	(Xeap) II	`	q) o) (
			¥	11 16		
Letter Designation	Surrogate Compound	Rec	Recovery QC Limits (Soil)	Recovery (Recovery QC Limits (Water)	Comments
A	Tetrachoro-m-xylene					

SUR.wpd

Decachlorobiphenyl

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LDC # 20 252 # 34 5 sdg #: كرو

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates



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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>X N N/A</u> Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was p

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

MS/MSD ID Compoun	Compound		MS %R (Limits)	nits)	×	MSD %R (Limits)	s) %R (Limite) RPD (Limits) Asso		Associated Samples	Qualifications	
1/21	(13	07 R	radi	× ×	QAN	ruet ca	calculated		S I	No qual	
	- 1		due (4	di wtitna	(Andi)	^		0	
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)	(())	^			1
	•		~	-				-			T

MSD.3S

LDC# 23XY F34 SDG #: La Carry METHOD: __GC __ HPLC

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 2nd Reviewer: Reviewer:

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

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

ANAN' N N/A

KN NA

Did the reported results for detected target compounds agree within 10.0% of the recalculated results? Did the percent difference of detected compounds between two columns /detectors <40%?

If no, please see findings bellow.

_	-	 	 	10	 	_	 	_	 -	 -
2	$(\gamma q c)$				0					
Qualifications	J dets/A									
vaRPD)%D Between Two Columns/Detectors └Imit (≤ 40%)	193.3									
Na N					 		 			
Sample (D	ę									
Compound Name	٩									
*										

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23252G3a SDG#:See cover

NA NA

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	of	
Reviewer:	NG	
2nd Reviewer:		

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A) Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs? N,NA

	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	6	11	(≤50%)			(Parent Only)
4,4'-DDE	18000	22000	20			
4,4'-DDT	19000	17000	11			
Dieldrin	300	390		90	≤1900	
Hexachlorobenzene	2600	3400		800	≤ 1900	
Methoxychlor	1000	3700U		2700	≤3700	

V:\FIELD DUPLICATES\23252F3a.wpd

Page: _____ of ____ Reviewer: ________ 2nd Reviewer: _______

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

X^2							
Y Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	22286.00	54850.00	139559.00	294636.00	443277.00	597478.00	
Compound	4,4'-DDT						
Column	CLP1		GCS_P2				
Date	04/26/2010						

5571.50 5485.00 5582.36 5892.72 5910.36 5974.78

			Potrona	
Regression Uulpul.			Lepul teu	
Constant		0.00000	11 U	0.0000
Std Err of Y Est	496	4961.04943		
R Squared		0.99953	-22	0.998900
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
			m1 =	5850.000000
X Coefficient(s)	5928.760416 0	0.444903		
Std Err of Coef.	36.118827	0.11		

Ave RF

5736.12

LDC # 25 25 2 F3(SDG# In Con SDG#

۲ م Reviewer: <u>_____</u>2nd Reviewer: _____ Page:

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

								Ave RF
X^2								
¥	Conc	4.00	10.00	25.00	50.00	75.00	100.00	
×	Area	39031.00	92016.00	218583.00	438324.00	653554.00	861853.00	
	Compound	Hexachlorobenzene			L			
	Column	CLP1		GCS_P2				
	Date	04/26/2010						

8714.05 8618.53

8966.96

9757.75 9201.60 8743.32 8766.48

Regression Output:			Reported	
Constant		0.00000	= 0	0.0000
Std Err of Y Est		4707.31355		
R Squared		0.99979	r2 =	006666'0
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		

LDC # 23 XX F34 4 SDG#

Page: $\frac{2}{3^{1}}$ of $\frac{4}{3^{1}}$ Reviewer: $\frac{3^{1}}{3^{1}}$

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

X*2	16.00	100.00	625.00	2500.00	5625.00	10000.00	
۲ Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	58418.00	134526.00	312150.00	605013.00	879444.00	1132166.00	
Compound	Hexachlorobenzene						
Column	CLP2		GCS_P2				
Date	04/26/2010						

Regression Output:			Reported	
Constant		8023.22168	11 S	NR
Std Err of Y Est		2267.04743		
R Squared		0.99998	12 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			n II	NR
X Coefficient(s)	12623.434031	-13.727283	= q	NR
Std Err of Coef.	108.349460	1.04		

14604.50 13452.60 12486.00 12100.26 11725.92 11321.66

Ave RF 12615.16

LDC # 23 25 × 43, 6 2005

4 NG 4 of Page: ___

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

X*2	16.00	100.00	625.00	2500.00	5625.00	10000.00	
Y Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	26707.00	68045.00	171312.00	355511.00	525805.00	705006.00	
Compound	4,4'-DDT						
Column	CLP2		GCS_P2				
Date	04/26/2010						

6676.75 6804.50 6852.48 7110.22 7010.73 7050.06

Regression Output:			Reported	
Constant		-2800.24293	 0	RN
Std Err of Y Est		3336.78918		
R Squared		0.99991	r2 =	0.999900
No. of Observations		6.00000		-
Degrees of Freedom		3.00000		
			а П	NR
X Coefficient(s)	7098.583493	-0.256471	= q	NR
Std Err of Coef.	159.475846	1.53		

Ave RF

6917.46

LDC # 23267 F34

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: _____ of ____ Reviewer: ___<u>_/</u> 2nd Reviewer: _____

METHOD: GC HPLC

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

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

N = Initial Calibration Factor or Nominal Amount

Where:

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

					Reported	Recalculated	Reported	Recalculated
		Calibration		CCV Conc	Conc	Conc	0 %	0%
#	Standard ID	Date	Compound					
-	005F0501	5/1/2010	Hexachlorobenzene CLP1	50	51.20	51.73	2.4	3.5
			4,4'-DDT CLP1	50	46.80	46.54	6.4	6.9
			Hexachiorobenzene CLP2	50	50.40	50.37	0.7	0.7
			4,4'-DDT CLP2	50	51.10	51.13	2.3	2.3
2								

	Compound		Area	ъ	q	υ
ž	CCV1 Hexachlorobenzene CLP1	CLP1	446566		8633.00	
	4,4'-DDT	CLP1	272261		5850.00	
	Hexachlorobenzene CLP2	CLP2	080609	-13.727283	12623.43	8023.22
	4,4'-DDT	CLP2	359488	-0.256471	7098.58	-2800.24293

LDC #: _______ 73 25 7 /= 34VALIDATION FINDINGS WORKSHEETSDG #: ______ Cov-__Surrogate Results Verification

Page:	_lof_1
Reviewer:	SVE
2nd reviewer:	

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

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

% Recovery: SF/SS * 100

Where:	SF = Surrogate Found
	SS = Surrogate Spiked

ample ID: <u> </u>	••••••		SS = Surroga	te Spiked		
Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	Col.]	0.07	0.06567	3 28	328	0
Decachlorobiphenyl			0	0	0	X
Decachlorobiphenyl						

Sample ID:

S

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

Sample ID:

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

Sample ID:

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

Notes:

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

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r.	7
LDC #:	# DOS

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

2 Page: _____of___ 2nd Reviewer: Reviewer:

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

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

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

Ś

2

MS/MSD samples:

RPD = 1 MS - MSD 1 * 2/(MS + MSD)

SSC = Spiked sample concentration SA = Spike added

Where:

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

SC = Concentration

W 18.7	Added (WS AC)		Spiked	Spiked Sample	Matrix	Matrix Spike	Matrix Spil	Matrix Spike Duplicate	Ws	MS/MSD
8		Concentration (いろ 人に)	Concet ^	Concentration ()	Percent	Percent Recovery	Percent	Percent Recovery		RPD
	U MSD	1.	WS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
4,4-DDT	18.4	0.	. 97	26	NC	139	NC	84)	R	0
		580	575	591	- 26	0	2 2	58	ح	6
Arocior 1260										

Comments: Refer ot Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. 2.1

LDC #: <u>>3 257 F 34</u> VALIDA SDG #: <u>Sre Conv</u> Laboratory Control Sample/Lab METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082) The percent recoveries (%R) and Relative Percent difference (RPD) compounds identified below using the following calculation: % Recovery = 100* (SSC-SC)/SA Where: SSC = Spike SA = Spike a RPD = 1 LCS - LCSD 1* 2/(LCS + LCSD) (LCS = Labore	esticides/PCBs veries (%R) and tifted below usin ssc-sc)/sA	cratory Co (EPA SW 84 I Relative Per Ig the followin	V ntrol Samp 6 Method 808 cent differenc ng calculation: where: SS	VALIDATION FINDING mple/Laboratory Contri 3081/8082) ance (RPD) of the laboratory on: ance (RPD) of the laboratory on: ssc = Spiked sample concentration SA = Spike added LCS = Laboratory control sample per	A VALIDATION FINDINGS WORKSHEET Page: 1 of 1 V Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification Reviewer: 3/4 V Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification Reviewer: 3/4 des/PCBs (EPA SW 846 Method 8081/8082) Soft Reviewer: 3/4 Page: 1 of 1 des/PCBs (EPA SW 846 Method 8081/8082) Soft Reviewer: 3/4 Page: 1 of 1 s (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the below using the following calculation: Soft Reviewer Soft Reviewer S)SA Where: SSC = Spiked sample concentration SC = Concentration SC = Concentration S)SA Where: SSC = Spiked sample concentration SC = Concentration SC = Concentration C = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery LCS = Laboratory control sample percent recovery	ORKSHEET Imple Duplic: I sample and lab	cate Results Ve boratory control sal SC = Concentration SC = Concentration	mple duplicate w	Page: Reviewer: 2nd Reviewer: vere recalculate	Page: 1 of) viewer: <u>Nr</u> viewer:
LCS/LCSD samples:	102	280- 12472	72/2-5							
	5	Spike	Spiked	Spiked Sample	S7	S	ГС	LCSD	TCS/TCSD	csD
Compound	pbd (Vg)	Added Vg /k_)	Concer (UK	Concentration (いん /と、)	Percent Recovery	tecovery	Percent	Percent Recovery	RPD	
	rcs		LCS		Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.1	₹¥	14.0	¥∿¥	87	63				
4,4'-DDT			14, 6		•	15				
Aroclor 1260										
Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of gualifications and associated samples when reported	o Laboratory C	Control Sample	e/Laboratory C	Control Samp	le Duplicate finding	s worksheet for li	ist of avalifications	and associated	samoles whe	en reported
results do not agree within 10.0% of the recalculated results.	e within 10.0%	of the recald	sulated results							

V:\Validation Worksheets\Pesticides\LCSDCLC.wpd

LDC #: 3257 \$32 SDG #: See Conv

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	W6
2nd reviewer:	

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

N N/A N N/A

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

Example: Sample I.D. # 6 4.9': b.b.T $Conc. = (\frac{300293}{(5850)})(10m1)(10m)) (10m) = 18538.9 = 19000 ng/kg

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

Note:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 23, 2010

LDC Report Date: June 4, 2010

Matrix:

Parameters: Chlorinated Pesticides

Soil

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-1

Sample Identification

SSAM3-02-1BPC SSAM3-02-3BPC SSAM3-02-5BPC SSAM3-02-7BPC SSAM3-02-9BPC SSAM3-02-1BPC_FD SSAM3-02-7BPCMS SSAM3-02-7BPCMSD SSAM3-02-9BPCMSD

Introduction

This data review covers 10 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

V. Blanks

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

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within the QC limits. Since the samples were diluted out, no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-1	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

Samples SSAM3-02-1BPC and SSAM3-02-1BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/Kg)		Difference		
Compound	SSAM3-02-1BPC	SSAM3-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	91000	91000	0 (≤50)	-	-	-
4,4'-DDT	41000	41000	-	0 (≤9500)	-	-
Dieldrin	1700	9500U	-	7800 (≤9500)	-	-
Hexachlorobenzene	16000	17000	-	1000 (≤9500)	-	-
Methoxychlor	5600	9600	-	4000 (≤18000)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-2836-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2836-1	SSAM3-02-1BPC SSAM3-02-3BPC SSAM3-02-5BPC SSAM3-02-7BPC SSAM3-02-9BPC SSAM3-02-1BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-2836-1

Laboratory: Test America

LDC #: 23252G3a

	Date:	6/64/10
	Page:	_of/
ł	Reviewer:	JVC.
2nd I	Reviewer:	On
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METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4 /23 /ro
.	GC/ECD Instrument Performance Check	A	/
.	Initial calibration	A	2 RSD rr
IV.	Continuing calibration/ICV	A	car/101 6 20 2
V.	Blanks	A	
VI.	Surrogate spikes	ŚW	
VII.	Matrix spike/Matrix spike duplicates	SN	
VIII.	Laboratory control samples	A	ИS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 1.6
XV.	Field blanks	ND	FB = FB-04/32010-RIG2-RZE (280-2400.

Note:

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

Soil

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SSAM3-02-1BPC 4	11	MB 280- 12762/1-A	21	31	
2	SSAM3-02-3BPC	12	/	22	 32	
3	SSAM3-02-5BPC	13		23	 33	
4	SSAM3-02-7BPC	14		24	34	
5	SSAM3-02-9BPC	15		25	35	
6	SSAM3-02-1BPC_FD	16		26	36	
7	SSAM3-02-7BPCMS	17		27	 37	
8	SSAM3-02-7BPCMSD	18	<u> </u>	28	38	
9	SSAM3-02-9BPCMS	19		29	 39	
10	SSAM3-02-9BPCMSD	20		30	40	

LDC #: 73 252 6 34 SDG #: Soc Carry

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

NC Page: 1 of 1 Reviewer: 2nd Reviewer:

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

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". <u>V N N/A</u> <u>V N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

Qualifications	No such															•			Comments	
%R (Limits)	0 (63-124)				()			()		() 0	()						()	()	Recovery QC Limits (Water)	
Surrogate Compound		810	8	A 12100			A 1930		0	0771 F		0	A 5740	0 {	A 7270				Recovery QC Limits (Soil)	
e ID Column	x) CILAS		2010×)			(x 0225			(X005)			1000x)		500×)					Surrogate Compound Re	
Date Sample ID	1 1 150		20 20			25) &			4 (5					5) 9 6					Letter Designation Surro	A Tetrachoro-m-xviene
*																				

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Decachlorobiphenyl

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LDC #:_	SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1 Reviewer: 376 2nd Reviewer:

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

Phease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Where a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SD Where a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SD

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

郯	N N/A N N/A	Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	zed every 20 rcent recove	samples for earies (%R) and th	ch m e rela	atrix or whenever a ative percent differ	a sam ence:	ach matrix or whenever a sample extraction was performec the relative percent differences (RPD) within the QC limits?	rformed? : limits?		6
*	Date	DI DSW/SW	Compound	MS %R (Limits)		MSD %R (Limits)		RPD (Limits)	Associated Samples	Qualifications	<u> </u>
		7 / 8	%	R ind	2 K		Cale	aulated)	4	ho shae	<u> </u>
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VALIDATION FINDINGS WORKSHEET **Field Duplicates**

Page:	<u> </u>
Reviewer:	NG
2nd Reviewer:	

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A) $\underline{Y/N NA}$ Were field duplicate pairs identified in this SDG?

N NA

Were target analytes detected in the field duplicate pairs?

	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	1	6	RFD (≤50%)			(Parent Only)
4,4'-DDE	91000	91000	0			
4,4'-DDT	41000	41000		0	≤9500	
Dieldrin	1700	9500U		7800	≤9500	
Hexachlorobenzene	16000	17000		1000	≤9500	
Methoxychlor	5600	9600		4000	≤18000	

V:\FIELD DUPLICATES\23252G3a.wpd

026369

Laboratory Data Consultants, Inc. Data Validation Report

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

Soil

Collection Date: April 26, 2010

LDC Report Date: June 4, 2010

Matrix:

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-1

Sample Identification

SSAI3-04-1BPC** SSAI3-04-3BPC SSAI3-04-5BPC SSAI3-04-7BPC SSAI3-04-9BPC SSAI3-04-1BPCMS SSAI3-04-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

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

V. Blanks

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

Sample FB-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SSAI3-04-1BPC**	Col. 1 Col. 2	Decachlorobiphenyl Decachlorobiphenyl	195 (63-124) 196 (63-124)	All TCL compounds	J+ (all detects)	А

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) were not within QC limits for one compound, the LCS 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. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2879-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. 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 280-2879-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-2879-1	SSAI3-04-1BPC**	All TCL compounds	J+ (all detects)	A	Surrogate spikes (%R) (s)
280-2879-1	SSAI3-04-1 BPC** SSAI3-04-3BPC SSAI3-04-5BPC SSAI3-04-7BPC SSAI3-04-9BPC	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-2879-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada

Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-2879-1

No Sample Data Qualified in this SDG

LDC #:<u>23252H3a</u> SDG #:<u>280-2879-1</u>

Laboratory: Test America

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B /4

	Date:	6/02/10
	Page:_	_lof_1_
	Reviewer:	NG
2nd	Reviewer:	0
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METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
<u>l.</u>	Technical holding times	A	Sampling dates: 4/2c /ro
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	2 RSp r ²
IV.	Continuing calibration/ICV	A	ca / 101 = 20 2
V.	Blanks	A	,
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	405
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	Á	
XIV.	Field duplicates	N	
XV.	Field blanks	SHAND	FB = FB-04072010-RZD (from 280-2216-2)

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

1	SSAI3-04-1BPC **	11	MB 280 - 13039 /6-	421	31	
2	SSAI3-04-3BPC	12	······································	22	32	
3	SSAI3-04-5BPC	13		23	33	
4	SSAI3-04-7BPC	14	·	24	34	
5	SSAI3-04-9BPC	15		25	35	
6	SSAI3-04-1BPCMS	16		26	36	
7	SSAI3-04-1BPCMSD	17		27	37.	· .
8		18		28	38	
9		19		29	39	
10		20		30	40	

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Page:___of___ Reviewer:______ 2nd Reviewer:______ E.e

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

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

VALIDATION FINDINGS CHECKLIST

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

VALIDATION FINDINGS WORKSHEET

6

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

A alpha-BHC	l. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	0 G .
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Arocior-1248	HH.
C. detta-BHC	K. Endrin	S. alpha-Chlordane	AA. Arocior-1254	H.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Arocior-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	Ϋ́,
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	L.
G. Heptachlor epoxide	0. 4,4'-DDT	W. Aroclor-1221	EE. Hexachlorobenzen	MM.
H. Endosulfan î	P. Methoxychlor	X. Arocior-1232	Ĥ	NN.

Notes:_

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VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

25 V Page: 1 of] 2nd Reviewer:____ Reviewer:___

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

Prease see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". <u>V N N/A</u> <u>V N M/A</u> Did all surrogate percent recoveries (%R) meet the QC limits? 沙

			Tetrachoro-m-xvlene	<
Comments	Recovery QC Limits (Water)	Recovery QC Limits (Soil)	Surrogate Compound	Letter Designation
	()			
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	()			
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	()			
	(
	156 (L)	کر ا	CH.	
+ dets / A (S)	5			
Qualifications	%R (Limits)	Surrogate In Compound	Sample ID Column	# Date

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Decachlorobiphenyl

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LDC # 23x52 Har SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1 Reviewer: <u>17</u> 2nd Reviewer: <u>7</u>

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the <u>QC limits?</u>

																				,			,			
Qualifications	No Mark .	(12 2))																								
Associated Samples																										
RPD (Limits)	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	
MSD %R (Limits)	"215 SA-137		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()		()	()	()	()	()	()	()	()
MS (Limits)	-15 (SO-13N)		()	(()	()	()	()	()	()	()	())	()	()	()	()	()	()	()	()	()	()	()	()	(.)
Compound	LL LL																									
MS/MSD ID Compound %R (Limits) %R (Limits) RPD (Limits)	1 / 4	// a	(XX)																							
# Date																										
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LDC # 22 252 Hyra Su Cores SDG#

V Page: 1 of 4Reviewer: \overline{M} Reviewer: <u>M</u> 2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

				·····	F		
X^2							
۲ Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	39031.00	92016.00	218583.00	438324.00	653554.00	861853.00	
Compound	Hexachlorobenzene					L	
Column	CLP1		GCS_P2				
Date	04/26/2010						

8714.05 8618.53

9757.75 9201.60 8743.32 8766.48 8966.96

Ave RF

0.1 4707.5 4707.5 4707.5 6. 0.1 5. 8674.807007 0.4	Regression Output:			Reported	
4707.31355 500000 500000 6.00000 6.00000 6.00000 8674.807007 0.444903			0.00000	11 U	0.00000
0.39979 ins 0.39979 ins 6.00000 ins 5.00000 ins 5.00000	Std Err of Y Est		4707.31355		
Instruction 6.0000 Jom 5.0000 Jom 5.0000 8674.807007 0.444903 24.37400 0.44	R Squared		0.99979	r2 =	006666.0
Jom 5.0000 8674.807007 0.444903 24.337600 0.44	No. of Observations		6.00000		
8674.807007 0.444903 24.3474500 0.444903 24.374500 0.44	Degrees of Freedom		5.00000		
8674.807007				m1 =	8633
24 774500	X Coefficient(s)	8674.807007	0.444903		
34.271300	Std Err of Coef.	34.271508	0.11		

LDC # 23 25 H3 A

4 2 4 Reviewer: <u>NG</u> 2nd Reviewer: <u>C</u> Page:

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Y X^2 Conc	4.00 16.00	10.00 100.00		50.00 2500.00	75.00 5625.00	100.00 10000.00	
X Area	26707.00			355511.00	525805.00	705006.00	
Compound	4,4'-DDT						
Column	CLP2		GCS_P2				
Date	04/26/2010						

6676.75

6852.48

6804.50

7010.73 7050.06

6917.46

Ave RF

7110.22

			Renorted	
Regression Output.				
Constant		-2800.24293	= 0	NR
Std Err of Y Est		3336.78918		
R Squared		0.99991	2 =	006666.0
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			11	NR
X Coefficient(s)	7098.583493	-0.256471	II Q	NR
Std Err of Coef.	159.475846	1.53		

23 YEN Had <u>ک</u> SDG# Cr LDC #

Page: 7 of 4 Reviewer: <u>JVC</u> 2nd Reviewer: <u>C</u>

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

X^2							
۲ Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	39031.00	92016.00	218583.00	438324.00	653554.00	861853.00	
Compound	Hexachlorobenzene				L		
Column	CLP1		GCS_P2				
Date	04/26/2010						

9757.75

9201.60 8743.32 8766.48 8714.05 8618.53

8966.96

Ave RF

Regression Output			Reported	
Constant		0.00000	= J	0.0000
Std Err of Y Est		4707.31355		
R Squared		0.99979	r2 =	006666.0
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		

LDC # 23 25 × H32 SDG# 20 Cm

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

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

X^2	16.00	100.00	625.00	2500.00	5625.00	10000.00	
×	16	100	625	250	562	1000	
Canc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	58418.00	134526.00	312150.00	605013.00	879444.00	1132166.00	
Compound	Hexachiorobenzene						
Column	CLP2		GCS_P2				
Date	04/26/2010						

13452.60 12486.00 12100.26 11725.92 11321.66

14604.50

12615.16

Ave RF

Regression Output:			Reported	
Constant		8023.22168	ш С	NR
Std Err of Y Est		2267.04743		
R Squared		0.99998	12 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			11	NR
X Coefficient(s)	12623.434031	-13.727283	p =	NR
Std Err of Coef.	108.349460	1.04		

LDC # 2 3 25 2 H 3 4 SDG# 24 Cwr

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: _____ of ____ Reviewer: ____//___ 2nd Reviewer: ______

METHOD: GC HPLC

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

Where:

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

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

					Reported	Recalculated	Reported	Recalculated
		Calibration		CCV Conc	Conc	Conc	D %	۵%
#	Standard ID	Date	Compound					
-	005F0501	5/8/2010	Hexachlorobenzene CLP1	50	48.80	49.33	2.4	1.3
			4,4'-DDT CLP1	50	50.20	49.89	0.3	0.2
			Hexachlorobenzene CLP2	50	49.40	49.43	1.2	1.1
			4,4'-DDT CLP2	50	52.70	52.71	5.4	5.4
2								

CCV1 Hexachlorobenzene CLP1 425898 8633.00 4,4'-DDT CLP1 291851 5850.00 8023.23 Hexachlorobenzene CLP2 598465 -13.727283 12623.43 8023.23 Hexachlorobenzene CLP2 370673 -0.256471 7098.58 -2800.245 4,4'-DDT CLP2 370673 -0.256471 7098.58 -2800.245	L	Compound		Area	Ø	q	U
CLP1 291851 5850.00 srobenzene CLP2 598465 -13.727283 12623.43 CLP2 598465 -0.256471 7098.58 CLP2 370673 -0.256471 7098.58 CLP2 370673 -0.256471 7098.58	<u>7</u>	xachlorobenzene	CLP1	425898		8633.00	
robenzene CLP2 598465 -13.727283 12623.43 CLP2 370673 -0.256471 7098.58	4,4	t-DDT	CLP1	291851		5850.00	
CLP2 370673 -0.256471 7098.58	Ŧ	xachlorobenzene	CLP2	598465	-13.727283	12623.43	8023.22
	4,4	t:-DDT	CLP2	370673	-0.256471	7098.58	-2800.24293

LDC #:_	73	257	H.34

1

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	<u>\of</u>
Reviewer:	SVE
2nd reviewer:_	Q2

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

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

% Recovery: SF/SS * 100

Sample ID:

Where:	SF = Surrogate Found
	SS = Surrogate Spiked

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	CGPI	4.0	3.72345	13	13	°I
Decachlorobiphenyl		ł	7.80862	195	195	
Decachlorobiphenyl		~1				

Sample ID:__

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

Sample ID:_

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

Sample ID:

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

Notes:_____

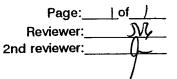
LDC # 13 25 4 436 SDG # 50 Cr + 78	x H 3a	oratory Co	V. ntrol Samp	ALIDATIO le/Laborat	VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Duplicate Results Verification	ORKSHEET	ate Results Vo		Page: Reviewer:_	1
									2nd Reviewer.	Y L
METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)	sticides/PCBs	(EPA SW 84	6 Method 808	1/8082)						
The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:	eries (%R) and fied below usin	I Relative Per of the followin	cent differenci g calculation:	e (RPD) of th	e laboratory contro	I sample and lab	oratory control sa	mple duplicate w	rere recalcula	ated for the
% Recovery = 100* (SSC-SC)/SA	sc-sc)/sA		Where: SS(SA	C = Spiked samp = Spike added	SSC = Spiked sample concentration SA = Spike added	Ō	SC = Concentration			
RPD = 1 LCS - LCSD 1 * 2/(LCS + LCSD)		2000 - 130 - 200	Z	S = Laboratory co	Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery	covery LCSD = Lab	oratory control sample	duplicate percent rec	covery	
LCS/LCSD samples:	?		A-11-							
	S	Spike	Spiked	Spiked Sample		rcs		LCSD	LCS/LCSD	csD
Compound	A e (Ue	Added	Concen (\M	Concentration (_\)	Percent	Percent Recovery	Percent	Percent Recovery	RPD	
	ΓCS		LCS		Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.3	NA A	15.2	A.A.	56	65				
4,4'-DDT	>>	+	11	1	86	۶ ۶				
Aroclor 1260										
Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of gualifications and associated samples when reported	to Laboratory C	Control Sampl	e/Laboratory (Control Samp	ele Duplicate findine	as worksheet for l	ist of qualification.	s and associated	samples whe	en reported
results do not agree within 10.0% of the recalculated results.	e within 10.0%	6 of the recald	culated results							

V:\Validation Worksheets\Pesticides\LCSDCLC.wpd

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LDC #: ~3252 H 3 A SDG #: _____

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification



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

N N/A N N/A

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

Example: Sample 1.D. $\frac{2}{10}$ [10 ml] $\frac{10}{5}$ Conc. = $\frac{(543758)}{(8633)}$ $\frac{10}{31.89}$ $\binom{0.925}{}$ = 107.04 2 110 ug/kg

#	Sample ID	Compound		Reported Concentration ()	Calculated Concentration ()	Qualification
		·				
			-		<u> </u>	

Note:

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23252

Metals

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 7, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-9

Sample Identification

SA137-9BPC

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 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P	
All samples in SDG 280-2216-9	All analytes reported below the PQL.	J (all detects)	A	

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2216-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-9	SA137-9BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2216-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2216-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Laboratory: Test America

23252A4

280-2216-9

LDC #:

SDG #:

Date: 6-3-16 Page: \of) Reviewer: _____ 2nd Reviewer: MH

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/7/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N	client specified
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X .	Furnace Atomic Absorption QC	N	Norueilized
XI.	ICP Serial Dilution	ม	Not preformed
XII.	Sample Result Verification	N	•
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NN	FB= FB0000-04072010-RZC

Note:

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

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

D = DuplicateTB = Trip blank EB = Equipment blank

Validated Samples:

1	SA137-9BPC	11	Rom	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27	·····	37	
8		18		28		38	
9	[19		29		39	
10		20		30		40	

Notes:

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 9, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-8

Sample Identification

SA42-2BPC SA42-4BPC

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 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2301-8	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2301-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2301-8	SA42-2BPC SA42-4BPC	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 280-2301-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2301-8

No Sample Data Qualified in this SDG

LDC #: 23252B4 VALIDAT

SDG #: 280-2301-8 Laboratory: Test America

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: <u>6-3-10</u> Page: <u>of 1</u> Reviewer: <u>6</u> 2nd Reviewer: <u>6</u>

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4/9/10
11.	ICP/MS Tune	A	
- 111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	$\overline{\mathcal{N}}$	Norvenized
XI.	ICP Serial Dilution	N	Norprefirmed
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-040782010-RZC

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank (280-2280-2) D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	SA42-2BPC	11	21	31
2	SA42-4BPC	12	22	32
3		13	23	33
4		14	24	34
5		15	25	35
6		16	26	36
7		17	27	37
8		18	28	38
9		19	29	39
10		20	30	40

Notes:__

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 13, 2010

LDC Report Date: June 7, 2010

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-2

Sample Identification

FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD

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Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 280-2400-2

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-04132010-RIG3-RZD	Cobalt	0.012 ug/L	1.0U ug/L

Sample EB-04132010-RIG3-RZD was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analytə	Concentration	Associated Samples
EB-04132010-RIG3-RZD	4/13/10	Cobalt Manganese Magnesium	0.012 ug/L 0.98 ug/L 5.3 ug/L	No associated samples in this SDG

Sample FB-04132010-RIG2-RZE was identified as a field blank. No metal contaminants were found in this blank.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2400-2	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2400-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-2	FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2400-2

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2400-2	EB-04132010-RIG3-RZD	Cobalt	1.0U ug/L	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23252C4 SDG #: 280-2400-2 Laboratory: Test America

Stage 2B

Date: 6-3-16 Page: of I Reviewer: CR 2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/13/10
II.	ICP/MS Tune	A	
- 111.	Calibration	A	
IV.	Blanks	ASW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	N	V °
VIII.	Laboratory Control Samples (LCS)	A	LES
IX.	Internal Standard (ICP-MS)	A	· · · · · · · · · · · · · · · · · · ·
Х.	Furnace Atomic Absorption QC	N	Notulitized
XI.	ICP Serial Dilution	N	Not preserved
XII.	Sample Result Verification	N	4
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
xv	Field Blanks	SW	FB=1, EB=2 (no associated samples)

Note:

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

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

valida	Wark				
1	FB-04132010-RIG2-RZE	11	8BW	21	31
2	EB-04132010-RIG3-RZD	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:

LDC #:_ 2325204 SDG #: SEO CO

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_	1 of
Reviewer:	(R
2nd reviewer:	12

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
17	matrix	Al, Sb, As) Ba, Be, Cd, Ca, Cr (Co) Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
- ```)		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN'
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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,
	<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, 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 ⁻ ,
	1	Al. Sb. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN [*] ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN [*] ,
· · ·	1	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 ⁻
	1	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, 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		AI, Sb(As) Ba, Be, Cd, Ca, Cr, Co)Cu, Fe Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
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

ELEMENTS.4

LDC #: 23252C4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units. unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA Associated Samples: All

1: NA Reason Code: bl



	C
Action 2 Limit	0.012/10
Maximum ICB/CCB ^a (ug/L)	0.0130
Maximum PB ^a (ug/L)	
Maximum PB ^a (mg/Kg)	
Analyte	, L

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

962 (C. 1

LDC #: 23252C4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Field Blanks

- 	g	Ţ
Page:	Reviewer:	2nd Reviewer.

	Action	2	
Sample Iden		Blank ID	Analyte
Associated San	/ Other: (ank type: (circle one) F	Field bla
	Blank units: <u>ug/L</u> Associated sample units: <u>mg/Kg</u> Sampling date: 4/13/10 Soil factor applied 100x	Blank units: <u>ug/L</u> Associated sample units: <u>m</u> Sampling date: 4/13/10 Soil factor applied	Blank un Samplin
	Nere target analytes detected in the field blanks?		YN N/A
	e Metals (EPA SW846 6010B/7000) Were field blanks identified in this SDG?	: Trac	METHOD:

Field Blank: (be)

ples														
No Associated Samples														
es: No Ass	ation													
Associated Samples:	Sample Identification													
Assoc	Ö													
(EB)														
/ Other:														
ank / Rinsate														
Field Bla		Action Level												
ield blank type: (circle one) Field Blank / Rinsate / Other.	Blank ID	2	0.012	0.98	5.3									
ield blaı	Analyte		රි	u M	Mg								<u>+</u>	

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".

EB-04132010-RIG3-RZD.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 13, 2010

LDC Report Date: June 7, 2010

Matrix:

Parameters: Arsenic & Manganese

Soil

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-9

Sample Identification

SSAO3-01-2BPC SA139-4BPC SSAO8-01-10BPC SA128-6BPC

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Arsenic and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No arsenic or manganese was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Manganese	0.974 ug/L	SSAO8-01-10BPC

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

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No arsenic or manganese was found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P	
All samples in SDG 280-2400-9	All analytes reported below the PQL.	J (all detects)	A	

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Data Qualification Summary - SDG 280-2400-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-9	SSAO3-01-2BPC SA139-4BPC SSAO8-01-10BPC SA128-6BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada

Arsenic & Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2400-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-2400-9

No Sample Data Qualified in this SDG

Tron	ox Northgate H	lenderson
VALIDATION	COMPLETENE	ESS WORKSHEET

Stage 2B

SDG #: 280-2400-9

LDC #: 23252D4

Laboratory: Test America

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

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

	Validation Area		Comments					
١.	Technical holding times	A	Sampling dates: 4/13/10					
11.	ICP/MS Tune	A						
111.	Calibration	A						
IV.	Blanks	SW						
V.	ICP Interference Check Sample (ICS) Analysis	A						
VI.	Matrix Spike Analysis	N	Client specified					
VII.	Duplicate Sample Analysis	N	client specified					
VIII.	Laboratory Control Samples (LCS)	A	LCS					
IX.	Internal Standard (ICP-MS)	A						
X.	Furnace Atomic Absorption QC	N	Norusiized					
XI.	ICP Serial Dilution	N	Notpreformed					
XII.	Sample Result Verification	N						
XIII.	Overall Assessment of Data	A						
XIV.	Field Duplicates	Ň						
xv	Field Blanks	NO	FB= FB-04072010-RZC, FB-04132010-RIG2-RZE					
Note:	(250-2280-2) (280-2460-2)							

Note: A =

N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank Date: 6-3-10

Page: <u>cof1</u> Reviewer: <u>c</u>

2nd Reviewer:

Validated Samples:

1	SSAO3-01-2BPC	11	105	21		31	
2	SA139-4BPC	12		22	· · · · · · ·	32	
3	SSAO8-01-10BPC	13	· · · · · · · · · · · · · · · · · · ·	23		33	
4	SA128-6BPC	14		24		34	/
5 6		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 #: 2325204 SDG #: 500 000

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_ Reviewer:	1 of
2nd reviewer:	

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,24		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg(Mn)Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN [*] ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B. Si, CN ⁻
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN.
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN [*] ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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',
	1	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN [*] ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
ICP-MS		Al, Sb 🙈 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:	Mercu	Inv by CVAA if performed

Comments: Mercury by CVAA if performed

ELEMENTS.4

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 3

Reason Code: bl



No Qualifiers	
Action Limit	
Maximum Maximum PB ^a ICB/CCB ^a (ug/L) (ug/L)	0.974
Maximum PB ^a (ug/L)	
Maximum PB ^a (mg/Kg)	
Analyte	Mn

a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note : 592% L

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 14, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-13

Sample Identification

SA17-9BPC SA43-2BPC

Introduction

This data review covers 2 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-22448-2) were identified as equipment blanks. No arsenic was found in these blanks.

Samples FB-04072010-RZC (from SDG 280-2280-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No arsenic was found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-13	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2448-13

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-13	SA17-9BPC SA43-2BPC	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 280-2448-13

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2448-13

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2448-13

No Sample Data Qualified in this SDG

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Stage 2B

LDC #:____ 23252E4 SDG #: 280-2448-13

Laboratory: Test America

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area						Co	mments	
I.	Technical holding times			A	Sampling	dates:	4/14/10		
11.	ICP/MS Tune			A					
111.	Calibration			R					
IV.	Blanks			A					
V.	ICP Interference Check Sam	ple (IC	CS) Analysis	A					
VI.	Matrix Spike Analysis			AN	Clier	its	perified		
VII.	Duplicate Sample Analysis			<u>N</u>		L			
VIII.	Laboratory Control Samples	(LCS)		A	LC	5			
IX.	Internal Standard (ICP-MS)			A					
X.	Furnace Atomic Absorption	QC		N	Not	1 Eiliz	ed		an bhanna a stairte an tarthainn a stairte an tarthainn a stairte an tarthainn a stairte an tarthainn a stairte
XI.	ICP Serial Dilution			N	Not	pero	rred		· · · · · · · · · · · · · · · · · · ·
XII.	Sample Result Verification			N					
XIII.	Overall Assessment of Data	Overall Assessment of Data							
XIV.	Field Duplicates			N					
xv	Field Blanks			NQ	FB=F	B-04	072010-RZC,	FB-0413	2010- RIGZ-RZE -2480-2)
Note: A = Acceptable ND = N N = Not provided/applicable R = Rin			R = Rin	o compound sate eld blank			22 80⁻ 2) D = Duplicate TB = Trip blank EB = Equipmen		-2480-2) *seebebu/
1	SA17-9BPC	11	PBS		21			31	
2	SA43-2BPC	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	

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= EB-04142010-RIG2-RZC ト

EB= EB- 04142010- RIGZ - RZC (280-2448-2)

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Notes:

Date: 6-3-16
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Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 22, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-1

Sample Identification

SSAN7-03-1BPC SSAN7-03-5BPC SSAO7-02-1BPC SSAO7-02-5BPC SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD SSAM2-01-5BPCMS SSAM2-01-5BPCMSD

**Indicates sample underwent Stage 4 review

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Introduction

This data review covers 9 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Cobalt, Lead, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobait	0.0462 ug/L	SSAN7-03-1BPC SSAN7-03-5BPC SSAO7-02-1BPC SSAO7-02-5BPC

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

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

Field Blank ID	Sampling Date	Analytə	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 ug/L	SSAN7-03-1BPC SSAN7-03-5BPC SSAO7-02-1BPC SSAO7-02-5BPC

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SSAM2-01-5BPCMS/MSD (SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD)	Lead	72 (75-125)	173 (75-125)	-	J (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

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Sample	Finding	Flag	A or P	
All samples in SDG 280-2771-1	All analytes reported below the PQL.	J (all detects)	А	

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAM2-01-1BPC** and SSAM2-01-1BPC_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentration (mg/Kg)					
Compound	SSAM2-01-1BPC**	SSAM2-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	3.2	2.8	-	0.4 (≤0.63)	-	-
Manganese	390	410	5 (≤50)	-	-	-
Lead	270	570	71 (≤50)	-	J (all detects)	A

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2771-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2771-1	SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD	Lead	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-2771-1	SSAN7-03-1BPC SSAN7-03-5BPC SSAO7-02-1BPC SSAO7-02-5BPC SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-2771-1	SSAM2-01-1BPC** SSAM2-01-1BPC_FD	Lead	J (all detects)	А	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

LDC #: 23252F4 SDG #: 280-2771-1 Laboratory: <u>Test America</u>

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 6-3-10)
Page: <u>\</u> of]	
Reviewer:	
2nd Reviewer:	

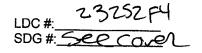
METHOD: Metals (EPA SW 846 Method 6020)

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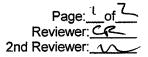
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation /	Area				C	omments	-
	Technical holding times			A	Sampling date	s: 4/22/10)	
<u> </u>	ICP/MS Tune			A		<u></u>		
	Calibration			A				
IV.	Blanks			SW				
V.	ICP Interference Check Sam	ple (IC	S) Analysis	A				
VI.	Matrix Spike Analysis			SW	ms/D	- 3		
VII.	Duplicate Sample Analysis			N				
VIII.	Laboratory Control Samples	(LCS)		A	US			
IX.	Internal Standard (ICP-MS)			A				
Х.	Furnace Atomic Absorption (20		N	NO+ULi II	ied		
XI.	ICP Serial Dilution			A				
XII.	Sample Result Verification			Â	Not rui	eved for 7	B	
XIII.	Overall Assessment of Data			A				
XIV.	Field Duplicates			SW	(5,7)			
XV	Field Blanks			SW	FB= FB-	04132010.RIG2	I-RZE, F	(280-2280-2)
Note: A = Acceptable ND = No compounds detected D = Duplicate D = Duplicate Note: N = Not provided/applicable R = Rinsate TB = Trip blank SW = See worksheet FB = Field blank EB = Equipment blank Validated Samples: Solution Solution								(250-2280-2)
			004				21	
1	SSAN7-03-1BPC	11	805		21		31	· · · · · · · · · · · · · · · · · · ·
2	SSAN7-03-5BPC	12			22		32	
3	SSAO7-02-1BPC	13			23		33	
	SSAO7-02-5BPC	14			24		34	
5	SSAM2-01-1BPC	15		<u></u>	25		35	
6	SSAM2-01-5BPC	16			26		36	
7	SSAM2-01-1BPC_FD	17			27		37	
8	SSAM2-01-5BPCMS	18			28		38	
9	SSAM2-01-5BPCMSD	19			29		39	
10		20			30		40	<u> </u>

Notes:

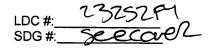


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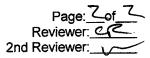


Method:Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.	1-	<u> </u>		
Cooler temperature criteria was met.		+		
His Caucitation and a second				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?		<u> </u>		
Were %RSD of isotopes in the tuning solution < 5%?	\leq	<u>†</u>		
Were all instruments calibrated daily, each set-up time?		<u>†</u>		
Were the proper number of standards used?		<u>†</u>		
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury and 85-115% for cyanide) QC limits?				
Were all initial calibration correlation coefficients > 0.995?				
M. Blacks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		ł	1	
IV-UCRYINE-ITAKING ICE DISPINIPAGE - 2				
Were ICP interference check samples performed daily?	<u> </u>			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	_			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		\		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	4	r (
V Laboratory control samples				
Was an LCS anaylzed for this SDG?	\square			
Was an LCS analyzed per extraction batch?	\square			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
VI Francession over some of the second se				
If MSA was performed, was the correlation coefficients > 0.995?				
Do all applicable analysies have duplicate injections? (Level IV only)			\square	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			_	ŕ
Were analytical spike recoveries within the 85-115% OC limits?				
VIETOP Sector International Contraction of the sector of t				An and the second s
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	\square			
Were all percent differences (%Ds) < 10%?	\leq	-		• • • • • • • • • • • • • • • • • • •
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
		a.		
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	~			
If the %Rs were outside the criteria, was a reanalysis performed?		Second second		
DX Regional cularity Association and Manality Control and the second state of the second				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?	Server and the			î
X. Sample Result vehication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Otenul as easing included and the second s				
Overall assessment of data was found to be acceptable.				
XIB Heins the inclusion				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

LDC #:_____ SDG #: Stocard

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

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2nd reviewer:	

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	Madix	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,
5-7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mr, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
6049		Al, Sb, As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe (P), Mg, Mn) Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN [*] ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, 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, 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, & Ba, Be, Cd, Ca, Cr, O Cu, Fe, , Mg, M, 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:	Moreu	ry by CVAA if performed

Comments: Mercury by CVAA if performed

ELEMENTS.4

LDC #: <u>23252F4</u> SDG #: <u>See Cover</u> METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Semulo Constration unite unloss otherwise acted model.

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 1-4

Reason Code: bl



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8.00 B		
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	No Qualifiers	
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10.20	0	
1.1.1	Action Limit	
	Action Limit	
1000		
	<u> </u>	
	Maximum ICB/CCBª (ug/L)	0.0462
		0.0
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	Maximum PB ^a (ug/L)	
	ă Paral	
1000	Maximum Maximum PB ^a PB ^a (ug/L)	
	E F	
	faximun PB ^a (mg/Kg)	
	mg P	
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	Analyte	
	An	0
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a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note :

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VALIDATION FINDINGS WORKSHEET

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LDC #	SDG #

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Lof Ś Reviewer: 2nd Reviewer:

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

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

N N/A

Were matrix spike percent recoveries (%R) within the control limits of $\hbar 5$ -1257) If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for water samples and $\leq 36\%$ for soil samples? EVEL IV ONLY: YN N/A

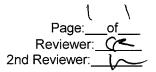
Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. AN N/A

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	as Qualifications	J /UJ/A (M)	NO QUAL (LCS IN)	Ì													
	Associated Samples	5-7		→													
	RPD (Limits)		27	47.													
	MSD %Recovery	113															
	MS %Recovery	72															
	Analyte	GD	90 9	ς L V V													
	Matrix	<u>86</u> !															
	UI USWSW	89															Comments:
\mathbf{b}	#																S S

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LDC#: <u>23252F4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates



8

METHOD: Metals (EPA Method 6020/7000)

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

	Concentratio	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	5	7	RPD	Difference	Limits	(Parent Only)
Arsenic	3.2	2.8		0.4	(≤0.63)	
Manganese	390	410	5			
Lead	270	570	71			Jdet/A (fd)

V:\FIELD DUPLICATES\FD_inorganic\23252F4.wpd

LDC #: 23259FY SDG #: 5660000

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: [[]of] Reviewer: <u>G</u> 2nd Reviewer: <u>1</u>

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

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

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the iCV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source %R = <u>Found</u> x 100 True

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing callbration)						
	CVAA (Continuing calibration)						
TCN	ICP/MS (Initial calibration)	Æ	C.14	ЧО	104	104	\sim
CCV	ICP/MS (Continuing calibation)	ЧV	1:25	20	104	6	4

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

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SDG #JEC COLON CJZSZZEZ

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Reviewer: (2nd Reviewer: Page:

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

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

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

S = Original sample concentration D = Duplicate sample concentration
Nhere,
-
8
-12 ₹
RPD = <u> S-D </u> (S+D)/2
RPI

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

%D = <u>II-SDR</u> × 100 Where, I = Initial St I SDR = Serial Dilution

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found 1 S / 1 (unite) (YS	True / D / SDR (units) MR/ 168	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
JLCS ALD	ICP interference check	Мn	102 201		201	102	2-
(\mathcal{C})	Laboratory control sample	Чð	602	0.02	101	101	
8	Matrix spike	As	5' 61 (72-782)	L'02	ЪЪ	hb	
8/9	Duplicate	UU W	927	ghce	2h	2h	
9	ICP serial dilution	Gd	61	64.3	3.7	3,4	\checkmark

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

TOTCLC.4SW

LDC #: 235254 SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	ι	_of	
Reviewer:	\mathcal{C}	e	
2nd reviewer:			Ĵ

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

Pjease see qu <u>// N N/A</u> /Y N N/A /Y N N/A	Are re	ons below for all questions answered "I results been reported and calculated o sults within the calibrated range of the I detection limits below the CRDL?	CORRECTIV/		
Detected anal following equa	lyte resu ation:	Its for	75	were recalculated an	d verified using the
Concentration =	(RD)(F	<u>V)(Dil)</u> Reca I.)(%S)	lculation:		
RD == FV == In. Vol. == Dil == %S ==	Raw da Final vo Initial vo Dilution	ta concentration slume (mi) plume (mi) or weight (G)	(10mL)(0 (0.899)	<u>(6.45,48</u> 14) <u>-</u> (1.118)	3.2 g/kg
Sample	ID	Analyte	Reported Concentration (~~~~ EQ)	Calculated Concentration	Acceptable (Y/N)
5		AS	3.7	3.2	
		mn	390	390	1
		PS	270	210	
					~
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RECALC.4S2

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 23, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-1

Sample Identification

SSAM3-02-1BPC SSAM3-02-5BPC SSAJ2-01-1BPC SSAJ2-01-5BPC SSAM3-02-1BPC_FD SSAM3-02-1BPCMS SSAM3-02-1BPCMSD

1

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic, Lead, and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Lead Manganese	0.0442 mg/Kg 0.144 mg/Kg	SSAM3-02-1BPC SSAM3-02-5BPC SSAM3-02-1BPC_FD

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

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No metal contaminants were found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAM3-02-1BPC and SSAM3-02-1BPC_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentral	ion (mg/Kg)				
Compound	SSAM3-02-1BPC	SSAM3-02-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Arsenic	1.4	2.3	-	0.9 (≤0.68)	J (all detects)	Α
Manganese	160	370	79 (≤50)	-	J (all detects)	A
Lead	1300	660	65 (≤50)	-	J (all detects)	A

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2836-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2836-1	SSAM3-02-1BPC SSAM3-02-5BPC SSAJ2-01-1BPC SSAJ2-01-5BPC SSAM3-02-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-2836-1	SSAM3-02-1BPC SSAM3-02-1BPC_FD	Arsenic	J (all detects)	A	Field duplicates (Difference) (fd)
280-2836-1	SSAM3-02-1BPC SSAM3-02-1BPC_FD	Manganese Lead	J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6-3-10 Page: __of_) Reviewer: _____ 2nd Reviewer: _____

SDG #: 280-2836-1 Laboratory: Test America

23252G4

LDC #:

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/23/10
II.	ICP/MS Tune	A	
.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X .	Furnace Atomic Absorption QC	N	Norveilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	R	
XIV.	Field Duplicates	SW	(1,5)
xv	Field Blanks	NO	FB- FB-04132010-RIGZ-RZE FB-04012010-RZ((280-2400-2) (280-2216-2)
			(280-2400-2) (280-2216-2)

Note:

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

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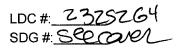
ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EΒ	=	Equipment	blank

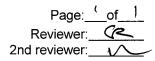
Validated Samples:

1	SSAM3-02-1BPC	11	BBS	21	31	
2	SSAM3-02-5BPC	12		22	 32	
3	SSAJ2-01-1BPC	13		23	 33	
4	SSAJ2-01-5BPC	14		24	 34	
5	SSAM3-02-1BPC_FD	15		25	35	
6	SSAM3-02-1BPCMS	16		26	36	
7	SSAM3-02-1BPCMSD	17		27	 37	
8		18		28	38	
9		19		29	 39	
10		20		30	40	

Notes:



VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference



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All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2,5		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 ⁻ ,
3,4		Al, Sb(As)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
QC6,1		Al, Sb, 🖎 Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, 🕑 Mg, 🥅 Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
ICP-MS		Al, Sb, (As) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, (Pb) Mg, (Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-
Comments:	Mercury	v by CVAA if performed

Comments: Mercury by CVAA if performed

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LDC #: <u>23252G4</u>
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ughter kg

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 1, 2, 5

00x Reason Code: bl



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

LDC#:<u>23252G4</u> SDG#:<u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates

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

METHOD: Metals (EPA Method 6020/7000)

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

Concentration (mg/Kg)			(≤50)	(mg/Kg)	(mg/Kg)	Qualifications	
Compound	1	5	RPD	Difference	Limits	(Parent Only)	
Arsenic	1.4	2.3		0.9	(≤0.68)	Jdet/A (fd)	
Manganese	160	370	79			Jdet/A (fd)	
Lead	1300	660	65			Jdet/A (fd)	

V:\FIELD DUPLICATES\FD_inorganic\23252G4.wpd

LDC Report# 23252H4

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 26, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-1

Sample Identification

SSAJ2-02-1BPC SSAJ2-02-5BPC** SSAR6-04-1BPC SSAR6-04-5BPC** SSAJ2-02-1BPCMS SSAJ2-02-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples FB-04062010-RZB (from SDG 280-2131-1) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No arsenic was found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2879-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2879-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2879-1	SSAJ2-02-1BPC SSAJ2-02-5BPC** SSAR6-04-1BPC SSAR6-04-5BPC**	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 280-2879-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2879-1

No Sample Data Qualified in this SDG

LDC #:___ 23252H4 SDG #: 280-2879-1 Laboratory: Test America

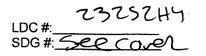
Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B /U

	Date:	<u>6-3</u>	510
	Page:_	_lof_	1
	Reviewer:	2	
2nd	Reviewer:	$-\iota$	\sim

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.

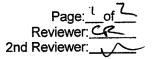
	Validation Area					Comments				
Ι.	Technical holding times			A	Samplin	ng da	ates: 4/26/10		· · · ·	
.	ICP/MS Tune			A			·····			
111.	Calibration			À						
IV.	Blanks			A						
V.	ICP Interference Check Sa	mple (I	CS) Analysis	A						
VI.	Matrix Spike Analysis			A	ms	5/1)			
VII.	Duplicate Sample Analysis			\mathcal{N}						
VIII.	Laboratory Control Sample	s (LCS)	1	A	LC	5_				
IX.	Internal Standard (ICP-MS)			A						
X .	Furnace Atomic Absorption	QC		\mathcal{N}	Not	-U-	tilized			
XI.	ICP Serial Dilution			A						
XII.	Sample Result Verification			A	Norr	e	tilized	B		
XIII.	Overall Assessment of Dat	а		A						
XIV.	Field Duplicates			N						
xv	Field Blanks			NQ	FB= FB04062010-RZB, FB-04072010-RZD (280-2131-1) (280-2216-2)					
Note: Validat	A = Acceptable N = Not provided/applicabl SW = See worksheet ed Samples:		R = Rin	o compound sate eld blank	s detecte	d C	D = Duplicate TB = Trip blank EB = Equipment blan		(280-2216-2)	
1	SSAJ2-02-1BPC	11	835		2.	1		31		
	SSAJ2-02-5BPC	12			22			32		
3	SSAR6-04-1BPC	13			23			33		
4	SSAR6-04-5BPC **	14			24 34					
5	SSAJ2-02-1BPCMS 15				25 35					
6	SSAJ2-02-1BPCMSD 16			26 36						
6 7		17			27	7		37		
8		18			28	3		38		
9		19			29	9		39		
10		20			30	5		40		
Notes										



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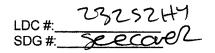
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VALIDATION FINDINGS CHECKLIST

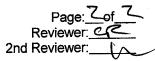


Method:Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
	2.4C			
All technical holding times were met.	\square			
Cooler temperature criteria was met.			() () () () () () () () () () () () () (
N-Calibration - Service -			19	
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution < 5%?	\square			
Were all instruments calibrated daily, each set-up time?	\leq			-
Were the proper number of standards used?	\square			
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury and 85-115% for cyanide) QC limits?				
Were all initial calibration correlation coefficients 2.995?				
ul Bients				
Was a method blank associated with every sample in this SDG?	\leq			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		(
IV-ICR Information Check Security				
Were ICP interference check samples performed daily?	\frown			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV-Manx-spike/Manx-spike/Hubilcales				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	~			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	\langle			
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	/			
V Laboratory contral samples and				
Was an LCS anaylzed for this SDG?	\angle			
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
Mi-Futhace Atomic absorption Adc				
If MSA was performed, was the correlation coefficients > 0.995?			-	
Do all applicable analysies have duplicate injections? (Level IV only)			_	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)				-
Were analytical spike recoveries within the 85-115% OC limits?				
VIII 100 Senabolitition				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?				
Were all percent differences (%Ds) < 10%?	/_	-		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/	1	
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	-	<u> </u>		
If the %Rs were outside the criteria, was a reanalysis performed?				
DX-Regional QuanterSonance, and Quality-control				
Were performance evaluation (PE) samples performed?		\leq	-	· · · · · · · · · · · · · · · · · · ·
Were the performance evaluation (PE) samples within the acceptance limits?		1000-100 IN 1000		F
X. Sample Result venn anon				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	$\left \right $			
XI OVERALESSESSMENTOPERER SHET				
Overall assessment of data was found to be acceptable.	\square			
XII-Feidelippicales				
Field duplicate pairs were identified in this SDG.		-		
Target analytes were detected in the field duplicates.			/	
Field blanks were identified in this SDG.	レ			
Target analytes were detected in the field blanks.		/		

LDC # 23252H4 SDG # Seecover

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of A Reviewer: QC 2nd Reviewer:

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

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

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source %R = <u>Found</u> x 100 True

# Found (uglt) True (uglt) 派R						Recalculated	Reported	
ICP (Initial calibration) ICP (Initial calibration) GFAA (Initial calibration) GFAA (Initial calibration) CVAA (Initial calibration) ICP (Continuing calibration) ICP (Continuing calibration) ICP (Continuing calibration) ICP (NKS (Initial calibration) ICP (Initial calibration) ICPMKS (Continuing calibration) ICP (Initial calibration) ICPMKS (Continuing calibration) ICP (Initial calibration)	Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
GFAA (initial calibration) GFAA (initial calibration) CVAA (initial calibration) CVAA (initial calibration) ICP (continuing calibration) F GFAA (continuing calibration) F GFAA (continuing calibration) F GFAA (continuing calibration) F ICP (xontinuing calibration) F ICP/MS (initial calibration) F ICP/MS (continuing calibration) F		ICP (Initial calibration)						
CVAA (Initial calibration) CVAA (Initial calibration) ICP (Continuing calibration) FAA (Continuing calibration) GFAA (Continuing calibration) P ICP/MS (Initial calibration) P ICP/MS (Initial calibration) P ICP/MS (Continuing calibration) P ICP/MS (Continuing calibration) P		GFAA (Initial calibration)						
ICP (Continuing calibration) ICP (Continuing calibration) GFAA (Continuing calibration) GFAA (Continuing calibration) ICP/MS (Initial calibration) AS ICP/MS (Continuing calibration) AS ICP/MS (Continuing calibration) AS		CVAA (Initial calibration)						
GFAA (Continuing calibration) GFAA (Continuing calibration) CVAA (Continuing calibration) A ICP/MS (Initial calibration) A ICP/MS (Continuing calibration) A ICP/MS (Continuing calibration) A		ICP (Continuing calibration)						
CVAA (Continuing calibration) CVAA (CVAA		GFAA (Continuing callbration)						
ICP/MS (Initial calibration) (AS 40,5 40,0) (O) (O) (O) (CP/MS (Continuing calibration) (AS 50,3 50,0 (O)		CVAA (Continuing calibration)						
ICP/MS (Continuing calibration) (AS 50,3 50.0 10)	NJI	ICP/MS (Initial calibration)	95 MS	40,5	40 Q		10/	Υ.
	CCN	ICP/MS (Continuing calibation)	A5	50,3	0°R,	101	101	٢

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

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LDC# 23252H1	1+1 1+1		VALIDATION FII Level IV Reca	ALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet			Page: 0f Reviewer: CK 2nd Reviewer: LX
METHOD: Trace M	METHOD: Trace Metals (EPA SW 846 Method 6010/7000)	od 6010/7	(000.		·		
Percent recoveries	Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:	nce check	: sample, a laboratory con	trol sample and a matrix	spike sample were	recalculated using th	ne following formula:
%R = <u>Found</u> x 100 True	Where, Found = Concer True =	centration of Found = Conce	Found = Concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). True = Concentration of each analyte in the source.	analysis of the sample. For the SR (sample result). ource.	matrix spike calcutation,		
A sample and dupli	A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:	rence (RF	D) was recalculated usin	3 the following formula:			
RPD = <u> S-D </u> × 100 (S+D)/2	Where, S=(D=[Original sam Duplicate sa	S = Original sample concentration D = Duplicate sample concentration				
An ICP serial dilution	An ICP serial dilution percent difference (%D) was recalculated using the following formula:) was rec	alculated using the followi	ng formula:			
%D = <u>II-SDRI</u> × 100 I	Where, I= Ir SDR = Serial [nitial Sample Ollution Rest	Where,	(5)			
					Recalculated	Raportad	
Sample ID	Type of Analysis	Element	Found / S / J S	True / D / SDR (unite)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	B	101 rolp	Icensil	10-(<u>)</u> -
577	Laboratory control sample		19.3	0.02	47	97	
ſ	Matrix spike		b'bl (us-uss)	21,2	94	dy	
5/6	Duplicate		9'52	24.6	2	Ч	
	ICP serial dilution	\rightarrow	5,7	5,93	Ч,О	3.5	\rightarrow
Comments: <u>Refe</u>	Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.	t for list of	qualifications and associ	ated samples when repor	rted results do not a	gree within 10.0% of	the recalculated results.

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LDC #: 23252H4 SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	L of
Reviewer:	CE
2nd reviewer:	

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

Please see qua	Are re	ns below for all questions answered "N" results been reported and calculated co sults within the calibrated range of the i detection limits below the CRDL?	rreciv /		
Detected analy following equat	te resul tion:	ts for	-]-5	were recalculated and	l verified using the
Concentration =	<u>(RD)(F</u> (In. Voi	/ <u>)(Dil)</u> Recalcu .)(%S)	ulation:		
RD = FV = In. Vol. = Dil = %S =	Final vo Initial vo Dilution	la concentration lume (ml) olume (ml) or weight (G) factor percent solids	100m L/S) (10.03) (0.92) (1.11g)))	u Syka
Sample [[0	Analyte	Reported Concentration (mg/Kg/)	Calculated Concentration (MS//CS)	Acceptable (Y/N)
7		AS	प, व	4,9	Ŷ
				· · · · · · · · · · · · · · · · · · ·	
		· · · · · · · · · · · · · · · · · · ·			
		·			

RECALC.4S2

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 27, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-1

Sample Identification

SSAR7-02-1BPC SSAR7-02-5BPC SSAR7-03-1BPC SSAR7-03-5BPC SSAR7-04-1BPC SSAR7-04-5BPC SSAK8-04-1BPC SSAK8-04-5BPC SSAK8-05-1BPC SSAK8-05-5BPC SSAR7-02-1BPCMS SSAR7-02-1BPCMSD

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples FB-04062010-RZB (from SDG 280-2131-1) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No arsenic was found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	ng Flag				
All samples in SDG 280-2960-1	All analytes reported below the PQL.	J (all detects)	A			

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2960-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2960-1	SSAR7-02-1BPC SSAR7-02-5BPC SSAR7-03-1BPC SSAR7-03-5BPC SSAR7-04-1BPC SSAK8-04-1BPC SSAK8-04-1BPC SSAK8-05-5BPC SSAK8-05-5BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2960-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 280-2960-1 Laboratory: Test America

23252J4

LDC #:

Date: 6-3-10 Page: __of /____ Reviewer: _____ 2nd Reviewer: _____

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METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/27110
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	us
IX.	Internal Standard (ICP-MS)	A	
X .	Furnace Atomic Absorption QC	N	Norveiszed
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=FB04062010-RZB, FB-04072010-RZD
Note:	A = Acceptable ND = N	o compound	(280-2131-1) $(280-2216-2)$

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

Validated Samples:

1	SSAR7-02-1BPC	11	SSAR7-02-1BPCMS	21	BBS	31	
2	SSAR7-02-5BPC	12	SSAR7-02-1BPCMSD	22		32	
3	SSAR7-03-1BPC	13		23		33	
4	SSAR7-03-5BPC	14		24	- 	34	
5	SSAR7-04-1BPC	15		25		35	
6	SSAR7-04-5BPC	16		26		36	
7	SSAK8-04-1BPC	17		27		37	
8	SSAK8-04-5BPC	18		28		38	
9	SSAK8-05-1BPC	19		29		39	
10	SSAK8-05-5BPC	20	<u> </u>	30		40	

Notes:

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 29, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3059-1

Sample Identification

SSAQ4-04-1BPC SSAQ4-04-5BPC SSAO4-05-1BPC** SSAO4-05-5BPC SSAO4-05-1BPC_FD SSAQ4-04-1BPCMS SSAQ4-04-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Arsenic.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples FB-04062010-RZB (from SDG 280-2131-1) and FB-04072010-RZC (from SDG 280-2280-2) were identified as field blanks. No arsenic was found in these blanks.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3059-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAO4-05-1BPC** and SSAO4-05-1BPC_FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/Kg)		D://			
Compound	SSAO4-05-1BPC**	SSAO4-05-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	4.2	6.2	38 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-3059-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3059-1	SSAQ4-04-1BPC SSAQ4-04-5BPC SSAO4-05-1BPC** SSAO4-05-5BPC SSAO4-05-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-3059-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-3059-1

No Sample Data Qualified in this SDG

LDC #: 23252L4 SDG #: 280-3059-1

Laboratory: Test America

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Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B/U

Date: <u>6-3-1</u> 0
Page: <u>of</u>
Reviewer: 0/2-
2nd Reviewer:

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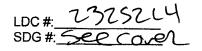
Constant.

METHOD: As (EPA SW 846 Method 6020)

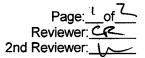
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation			Comments								
١.	Technical holding times	Technical holding times			Sampling of	Sampling dates: 4/29/10						
II.	ICP/MS Tune			A								
	Calibration	Calibration										
IV.	Blanks			A								
<u>V.</u>	ICP Interference Check Sam	ple (IC	S) Analysis	5		·						
VI.	Matrix Spike Analysis			A	ms/D							
VII.	Duplicate Sample Analysis			N								
VIII.	Laboratory Control Samples (LCS)		A	us)						
IX.	Internal Standard (ICP-MS)			A		·······						
<u>X.</u>	Furnace Atomic Absorption C	20		N A	Notu	utilized						
XI.	ICP Serial Dilution	ICP Serial Dilution										
X11.	Sample Result Verification			- Au	Notr	reviewed for tereland 2B						
XIII.	Overall Assessment of Data	Overall Assessment of Data			<u> </u>							
XIV.	Field Duplicates			SW	$(45)^{(3,5)}$							
xv	Field Blanks			20	FB=F804062010-RZB, FB-04072010-RZC (280-2131-1) (280-2280-2)							
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet		R = Rins FB = Fie) detected D	(280-2131-1) D = Duplicate TB = Trip blank EB = Equipment blank						
Validat	ed Samples: ** Leve Soil											
1	SSAQ4-04-1BPC	11	R005		21	31						
2	SSAQ4-04-5BPC	12	U -		22	32						
3	SSA04-05-1BPC	13			23	3 33						
4	SSAO4-05-5BPC	14			24	4 34						
5	SSAO4-05-1BPC_FD	15			25	5 35						
6	SSAQ4-04-1BPCMS	16			26	36						
7	SSAQ4-04-1BPCMSD	17			27	37						
8		18			28	3 38						
9		19			29	39						
10		20			30	40						

Notes:_



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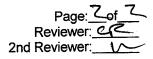
Method:Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
1. dechaica molor gamas at a same	1			
All technical holding times were met.	/			
Cooler temperature criteria was met.		[
H Gallbronder a second state of a second state o				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	\leq			
Were %RSD of isotopes in the tuning solution < 5%?	$\[\]$			
Were all instruments calibrated daily, each set-up time?	$\left \right $			
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury and 85-115% for cyanide) QC limits?	/			
Were all initial calibration correlation coefficients > 0.995?				
III. Branks				
Was a method blank associated with every sample in this SDG?	\leq			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV-ROP/Interdences/Checks/Samples				
Were ICP interference check samples performed daily?	\square			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV Mathx spike/Matox spike/upijcalos				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/	-		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		ſ		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.				
V Laboratory control samples				
Was an LCS anaylzed for this SDG?	\frown			
Was an LCS analyzed per extraction batch?		,		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



1. 1. A. S. A.

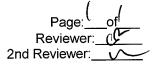
VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
MI Enna Se Monure Absorptions de				
If MSA was performed, was the correlation coefficients > 0.995?			_	
Do all applicable analysies have duplicate injections? (Level IV only)				
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			_	<u></u>
Were analytical spike recoveries within the 85-115% QC limits?	and the second second			
VALUES SOCIALITIES IN THE SECOND SECOND	or e			
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	\leq			
Were all percent differences (%Ds) < 10%?	_	-		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
WINNERTA Standards (EPAXS) A B45 Weth 60 60 20 7 4				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	\square	r 		
If the %Rs were outside the criteria, was a reanalysis performed?	/			
IX REGIONAL CLEARLY CASSILIANCE AND COUBINY, CORRECT AND COUPER STORE				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X Sample result verifications				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/	<u> </u>		
XI OVERAIL RECEIPTION OF THE				
Overall assessment of data was found to be acceptable.				
XII2Fleid Supporties and the second				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.	~			
XIN-Eletablandestation of the second s				
Field blanks were identified in this SDG.	/	<u> </u>	ļ	
Target analytes were detected in the field blanks.		\lfloor		

LDC#:<u>23252L4</u> SDG#:<u>See Cover</u>

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

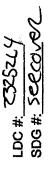


METHOD: Metals (EPA Method 6020/7000)

<u>YN NA</u> YN NA Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	*3	5	RPD	Difference	Limits	(Parent Only)
Arsenic	47 4.2	6.2	× 38			

V:\FIELD DUPLICATES\FD_inorganic\23252L4.wpd



VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification



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

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

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source %R = <u>Found</u> x 100 True

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
NC H	ICP/MS (Initial calibration)	As	38.4	0'eh	96	96	<u>)</u>
CCJ	ICP/MS (Continuing calibation)	£	48.4	<i>R</i> O	97	47	۲ ۲

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

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LDC # <u>2325264</u> SDG # <u>566 (CC</u> 00	L J		VALIDATION FIN Level IV Recal	ALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet	ħ	ম	Page:
METHOD: Trace Me	METHOD: Trace Metals (EPA SW 846 Method 6010/7000)	q 6010/70	(00)				
Percent recoveries (Percent recoveries (%R) for an ICP interference check sampl	ce check	sample, a laboratory cont	e, a laboratory control sample and a matrix spike sample were recalculated using the following formula:	pike sample were r	ecalculated using the	following formula:
%R = <u>Found</u> × 100 True	Where, Found = Concer True =	ntration of e Found = Concen	Where, Found = Concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spite calculation, Found = SSR (spiked sample result) - SR (sample result). True = Concentration of each analyte in the source.	natysis of the sample. For the n SR (sample result). wrce.	natrix spike calculation,		
A sample and duplic	A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:	ance (RPI	D) was recalculated using	the following formula:			
RPD = <u> S-D </u> × 100 (S+D)/2	Where, S = O	riginal samp uplicate sar	S = Original sample concentration D = Duplicate sample concentration				
An ICP serial dilutio	An ICP serial dilution percent difference (%D) was recalculated using the following formula:	was reca	Iculated using the followi	ng formula:			
%D = <mark> -SDR </mark> × 100	Where, I= fni SDR = Serial Di	tial Sample Iution Resu	Where, 1 = initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (instrument Reading x 5)	(2)			
					Recalculated	Reported	
Samule ID	Type of Analysis	Element	Found / S / 1 (units) melks	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
ICS AB	ICP interference check	£	- Jon UO	Norrol	ICC	100	2
102	Laboratory control sample		18.4	07	26	26	<
Q	Matrix spike		C: L1 (us-uss)	18.4	Jul	24	
6/7	Duplicate		22.4	24.1	2	7	
	ICP serial dilution	\rightarrow	51	hdh	3.1	З, –	
Comments: <u>Refe</u>	Comments: Refer to appropriate worksheet for list of qualit	for list of	dualifications and associ	fications and associated samples when reported results do not agree within 10.0% of the recalculated results.	ted results do not a	gree within 10.0% of	the recalculated results.

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LDC #: 232521 SDG #: Secore μ

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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Reviewer:	\overline{C}	P	
2nd reviewer:		~U	

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

Please see qu <u>// N N/A</u> <u>/Y N N/A</u> <u>/Y N N/A</u>	Are re	ons below for all questions answered "N". results been reported and calculated co sults within the calibrated range of the in I detection limits below the CRDI?	frecuv /		
Detected analy following equa	yte resul ition:	Its for HS	· · · · · · · · · · · · · · · · · · ·	were recalculated and	I verified using the
Concentration =	<u>(RD)(F</u> (In. Vol	<u>V)(Dil)</u> Recalcu L)(%S)			
RD == FV == Dil == %S ==	Final vo Initial vo Dilution	ta concentration Nume (ml) Dlume (ml) or weight (G) factor I percent solids	(100m4)(5) 0,93 (1	(0.8181814) (1000 =	4.2 mg/kg
Sample I	D	Analyte	Reported Concentration (MOIKCR)	Calculated Concentration (mg/(g/))	Acceptable (Y/N)
3		AS	4,2	4.2	
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RECALC.4S2

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23252

Perchlorate

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 13, 2010

LDC Report Date: June 7, 2010

Matrix: Water

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-2

Sample Identification

FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD

Introduction

This data review covers 2 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

Sample EB-04132010-RIG3-RZD was identified as an equipment blank. No perchlorate were found in this blank.

Sample FB-04132010-RIG2-RZE was identified as a field blank. No perchlorate were found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P	
All samples in SDG 280-2400-2	All analytes reported below the PQL.	J (all detects)	A	

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 280-2400-2

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-2	FB-04132010-RIG2-RZE EB-04132010-RIG3-RZD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2400-2

No Sample Data Qualified in this SDG

LDC #:_	23252C6
SDG #:	280-2400-2
Laborato	ory: Test America

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 67 Page: L of Reviewer: C 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
I.	Technical holding times	A	Sampling dates: 4/13/10
Ila.	Initial calibration	A	
lib.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Clientspecified
V	Duplicates	\mathbb{N}	
VI.	Laboratory control samples	A	LES/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
Lx	Field blanks	NQ	FB=1, EB=Z (no associated samples)

Note:

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

R = Rinsate

ND = No compounds detected FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples: Jar

1	FB-04132010-RIG2-RZE	11	POW	21	31	
2	EB-04132010-RIG3-RZD	12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:_

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 14, 2010

Soil

LDC Report Date: June 7, 2010

Matrix:

Parameters: Perchlorate

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-13

Sample Identification

SSAN6-01-2BPC SSAN6-01-2BPCMS SSAN6-01-2BPCMSD SSAN6-01-2BPCDUP

Introduction

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

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

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

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG2-RZC	4/14/10	Perchlorate	2.3 ug/L	All samples in SDG 280-2448-13

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

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-13	All analytes reported below the PQL.	J (all detects)	A

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2448-13

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-13	SSAN6-01-2BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2448-13

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2448-13

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2448-13

No Sample Data Qualified in this SDG

LDC #:_______ SDG #: 280-2448-13

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 28 4

Date: 6-3-10	C
Page: Lof \	
Reviewer:	
2nd Reviewer:	-

Laboratory: Test America

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
١.	Technical holding times	A	Sampling dates: 4/14/10
lla.	Initial calibration	A	
llb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/D
V	Duplicates	A	DP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	
VIII.	Overall assessment of data	R	
IX.	Field duplicates	N	
x	Field blanks	SW	FB FB-04072010-RZC, EB= EB-0142010-RIG1-RZC
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	ND = No compound R = Rinsate FB = Field blank	FG FG-04072010-RZC, EG: EB-0142010-RIG1-RZC C250-2280-2) = EG-0142010-RIG1-RZC ds detected D = Duplicate TB = Trip blank (S10642 250-2448-2) EB = Equipment blank EB = Equipment blank

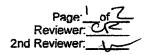
Validated Samples: Sol

1	SSAN6-01-2BPC	11	PBS	21	31	
2	SSAN6-01-2BPCMS	12		22	32	
3	SSAN6-01-2BPCMSD	13		23	33	
4	SSAN6-01-2BPCDUP	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:_____

ZZZZEG LDC # See Ca SDG #:

VALIDATION FINDINGS CHECKLIST



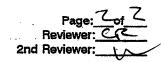
Yes No NA Findings/Comments Validation Area 5.77.55 1 All technical holding times were met. Cooler temperature criteria was met. Were all instruments calibrated daily, each set-up time? Were the proper number of standards used? Were all initial calibration correlation coefficients > 0.995? Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? Were titrant checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) and the second Was a method blank associated with every sample in this SDG? Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL. Was an LCS anayized for this SDG? Was an LCS analyzed per extraction batch? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits? entre 6 sente / Dente Were performance evaluation (PE) samples performed? Were the nerformance evaluation (PF) samples within the acceptance limits?

Method: Inorganics (EPA Method Second)

WETC-EPA.IV version 1.0

LDC #: 2325266 SDG #: <u>See caret</u>

VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verdication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	~			
Were detection limits < RL?		۲		
VTHLONE (all assessments of date)				
Overall assessment of data was found to be acceptable.	/	r		
X Field duplicates				
Field duplicate pairs were identified in this SDG.				· .
Target analytes were detected in the field duplicates.			/	· ·
X. Field blecks				
Field blanks were identified in this SDG.	/	c i		
Target analytes were detected in the field blanks.	7			

32F6	Cover
2316	See
LDC #:	SDG #

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of Reviewer: OC 2nd Reviewer.

Reason Code: be

	ntification					
mples: All	Sample Identification					
Associated Samples: $A^{(I)}$						
her:		NaQapon				
Soil factor applied 10x eld Blank / Rinsate / Oth	Action Limit		0.23			
ne) Fi	Blank ID	EB-04142010-RIG2-RZC (SDG#: 280-2448-2)	2.3			
Sampling date: 4/14/10 Field blank type: (circle o	Analyte		CI04			

EB-04142010-RIG2-RZC-CIO4.wpd

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238336	See color
¥	ŧ.
Ľ	SDG

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

2nd Reviewer: Page: of brack

Method: Inorganics, Method <u>314.0</u>

____was recalculated.Calibration date: _____/2.1/LO The correlation coefficient (r) for the calibration of <u>ClO</u>

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

%R = Found X 100

True

Where,

Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(N/N)
Initial calibration		s1	-	0.00247			
		s2	2.5	0.00841	0.998766	0.998766	•
		s3	5	0.01661			7-
		s4	10	0.03291			
	_	s5	20	0.06345			
		s6	40	0.14097			
Calibration verification		ICV	10	Fernd (1344) 18.889	hb	I	
Calibration verification		S	Õ	116,1	00	1	\rightarrow
Calibration verification							

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

spraces	Second
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet



METHOD: Inorganics, Method Secover

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

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source. Found = True = Where, $%R = Found \times 100$ True

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

RPD = <u>[S-D]</u> x 100 Where, S = Origi (S+D)/2 D = Dupi

Original sample concentration Duplicate sample concentration

	•	- -			Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / S	True / D funite)	04R / 8%	%R / RPD	Acceptable (Y/N)
577	Laboratory control sample	clo,	6.0917	Ó.	93	6)-
2	Matrix spike sample		(185-185)	1172	106	108	
5	Duplicate sample	\rightarrow	QSh	- - - - 	2	1	

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

TOTCLC.6

LDC #: SDG #: <

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

C

Pag Reviewe 2nd reviewer

= 480 mg/ kg

reported with a positive detect were

METHOD: Inorganics, Method

SECON

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N N/A Have results been reported and calculated correctly?

<u>Y N N/A</u> <u>Y N N/A</u> <u>Y N N/A</u>

Are results within the calibrated range of the instruments? Are all detection limits below the CRQL?

Concentration =

DF solid

Recalculation: 0.07628+0.0008 2000 0.0034 1000 (D Q U)

			_ (0,94)		
#	Sample ID	Analyte	Reported Concentration (MR/KR)	Calculated Concentration (WY 1887	Acceptable (Y/N)
	1	. ClOy	480	480	Ý
	1	. <u> </u>	100		,
	·			· · · · · · · · · · · · · · · · · · ·	
<u> </u>				· · ·	
					
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	1		l		L

Note:

RECALC.6

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 22, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2771-1

Sample Identification

SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD SSAM2-01-5BPCMS SSAM2-01-5BPCMSD SSAM2-01-5BPCDUP

**Indicates sample underwent Stage 4 review

1

Introduction

This data review covers 6 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

Sample FB-04132010-RIG2-RZE (from SDG 280-2400-2) was identified as a field blank. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2771-1	All analytes reported below the PQL.	J (all detects)	A

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples SSAM2-01-1BPC** and SSAM2-01-1BPC_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/Kg)		D.//		
Analyte	SSAM2-01-1BPC**	SSAM2-01-1BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Perchlorate	0.015	0.011	-	0.004 (≤0.011)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2771-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2771-1	SSAM2-01-1BPC** SSAM2-01-5BPC SSAM2-01-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2771-1

No Sample Data Qualified in this SDG

LDC #:<u>23252F6</u> SDG #:<u>280-2771-1</u>

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

Laboratory: Test America

Date: 6-3-10 Page: 1 of 1 Reviewer: 2 2nd Reviewer: _____

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

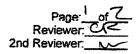
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation	Area				Comment	S
I.	Technical holding times			A	Sampling dates:	4122/10	
lia.	Initial calibration			A			
llb.	Calibration verification			5			
111.	Blanks			A			
IV	Matrix Spike/Matrix Spike	Duplicat	es	A	msla		
V	Duplicates			A	Dip		
VI.	Laboratory control samples			M	LCS		
VII.	Sample result verification			D*	Not review	red for ZB	
VIII.	Overall assessment of data	1		PT			
IX.	Field duplicates			SW	$\left(1,3\right)$		
Lx	Field blanks			NO	FB = FF	<u>3-04132010-RJA</u> (280-2400-2) D = Duplicate	GA-RZE
Note: Valida	A = Acceptable N = Not provided/applicabl SW = See worksheet ted Samples:		R = Rin FB = Fi	o compound sate eld blank		TB = Trip blank EB = Equipment blank	
1	SSAM2-01-1BPC	11	POS		21	31	
2	SSAM2-01-5BPC	12			22	32	
3	SSAM2-01-1BPC_FD	13			23	33	
4	SSAM2-01-5BPCMS	14			24	34	
5	SSAM2-01-5BPCMSD	15			25	35	
6	SSAM2-01-5BPCDUP	16			26	36	
7		17	······		27	37	
8		18			28	38	
9		19			29	39	
10		20		····	30	40	

Notes:_____

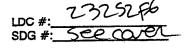
LDC #_ 23252F6 SDG #_ <u>See Caren</u>

VALIDATION FINDINGS CHECKLIST

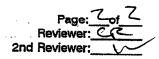


Method: Inorganics (EPA Method Second

Validation Area Yes No NA Findings/Comments Discretional indication of the wave met.		1.		.	
All technical holding times were met. Coolor temperature oritorie was met. Were all instruments calibrated daily, each set-up time? Were the proper number of standards used? Were the proper number of standards used? Were all initial calibration coefficients > 0.966? Were all initial and continuing calibration verification %Rs within the 90-110% QC Initis? Were thank checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance stated with every sample in this SDG? Was there contamisation in the method blanks? If yes, please see the Blanks SOC? If on, indicate which matrix does not have an associated MSMSD or MS/DUP. Soil / Water. Were the MSMSD porcent recoveries (KR) and the relative percent differences (PCD) within the 71-132 Colimity If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MSMSD or fulpicate relative percent differences (RPD) < 20% for waters and \$5 KF for exil samples? A control init of < CRDL(>22 CKDL(>23 CKDL(>	Validation Area	Yes	i No	I NA	Findings/Comments
Cooler temperature criteria was met. Were all instruments calibrated daily, each set-up time? Were the proper number of standards used? Were the proper number of standards used? Were all initial calibration correlation coefficients > 0.995? Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? Were thank checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Were an attric balke (MS) and duplicate (DUP) analyzed for each matrix in this SDG? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) < 20% for matrix on the relative percent differences (RPD) < 20% for waters and ≤ 55% for soil ample? A control immal < CRDL (≤ 2X CRDL for soil) was used for tamples A control immale concentration exceeded the spike (Control immale? A control immale < CRDL (≤ 2X CRDL for soil) was used for tamples A control immale < CRDL (≤ 2X CRDL for soil) was used for tamples A control immale < CRDD (< 2X CRDL for soil) was used for tamples A control i					
Were all Instruments calibrated daily, each set-up time?	All technical holding times were met.		<u> </u>		
Were the proper number of standards used?	Cooler temperature criteria was met.				
Were the proper number of standards used?		and an		1	
Were all initial calibration correlation coefficients > 0.995?	Were all instruments calibrated daily, each set-up time?	\leq	<u> </u>		
Were all initial and continuing calibration verification %Rs within the 90-110% QC Imits? Were titrant checks performed as required? (Level IV only) Imits? Were balance checks performed as required? (Level IV only) Imits? Was a method blank associated with every sample in this SDG? Imits? Was there contamination in the method blanks? If yes, please see the Blanks Imits? Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this Imits? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) wate the sample concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and wate concentration was tak	Were the proper number of standards used?	\leq	·		
Imits? Were tifrant checks performed as required? (Level IV only) Were balance checks performed as required? (Level IV only) Imits? Was a method blank associated with every sample in this SDG? Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) < 20% for	Were all initial calibration correlation coefficients > 0.995?	/	۲ 		
Were balance checks performed as required? (Level IV only) If Solids Was a method blank associated with every sample in this SDG? Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Marking Was indicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MSMSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for was used for samples that were < 5X the CRDL, including when only one of the			-		
Was a method blank associated with every sample in this SDG? Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Master contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Master contamination in the method blanks? If yes, please see the Blanks Validation completeness worksheet. Master contamination in the method blanks? If yes, please see the Blanks Was a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL. Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was an LCS analyzed for this SDG? Was an LCS analyzed per extraction batch? Were the LCS percent recoveries (%R) and relative percent differences (RPD)	Were titrant checks performed as required? (Level IV only)			1	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Design of the second s	Were balance checks performed as required? (Level IV only)			1	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. Design of the second s					
validation completeness worksheet. Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were < 5X the CRDL, including when only one of the	Was a method blank associated with every sample in this SDG?	レ			
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SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and < 35% for soil samples? A control limit of < CRDL(< 2X CRDL for soil) was used for samples that were < 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL. Was an LCS anaylzed for this SDG? Was an LCS analyzed per extraction batch? Were the LCS percent recoveries (%R) and relative percent difference (RPD)					
(RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. Were the MS/MSD or duplicate relative percent differences (RPD) < 20% for waters and < 35% for soil samples? A control limit of < CRDL(< 2X CRDL for soil) was used for samples that were < 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	SDG? If no, indicate which matrix does not have an associated MS/MSD or		、 、		
waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were < 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	(RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike	<u> </u>	· ~		
Was an LCS analyzed per extraction batch?	waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the	1	-		
Was an LCS analyzed per extraction batch?					
Were the LCS percent recoveries (%R) and relative percent difference (RPD)	Was an LCS anayized for this SDG?	イ		Τ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	Was an LCS analyzed per extraction batch?	1			
	Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	7	-		
Vi Securité Catalité Association au Colarité Catalité Catalité	V. Required Caseling Association and Consiling Engand				
Were performance evaluation (PE) samples performed?		T	7		
Were the parformance evaluation (PE) samples within the acceptance limits?				7	



VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Venfication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	-	 		
Were detection limits < RL?		Γ		
Mg. Overall assessment of data				and the second second second second
Overall assessment of data was found to be acceptable.	/	-		
IX Plate duplication				
Field duplicate pairs were identified in this SDG.	/			· .
Target analytes were detected in the field duplicates.				
X. Field blecks				
Field blanks were identified in this SDG.	/			· ·
Target analytes were detected in the field blanks,				

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	L_of
Reviewer:	
2nd Reviewer:	<u> </u>

Inorganics, Method: See Cover



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

	Concentrati	on (mg/Kg)				Qualification
Analyte	1	3	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Perchlorate	0.015	0.011		0.004	(≤0.011)	

V:\FIELD DUPLICATES\FD_inorganic\23252F6.wpd

Method $3H, Q$ It (r) for the calibration of CQA_{-} was recalculated. Calibration date: $-4/2J/IO_{-}$ Ibration verification percent recovery (%R) was recalculated for each type of analysis using the following Where, Found = concentration of each analyte in the loc vorce Where, Found = concentration of each analyte in the loc vorce True = concentration of each analyte in the ICV or CCV source Analyte Standard Conc. (ug/l) Area Recalculated Reported Analyte Standard Conc. (ug/l) Area Recalculated Reported Analyte Standard Conc. (ug/l) Area Recalculated Reported S2 2.0.00241 0.998771 S5 0.002391 0.998777 S6 4.0 0.01661 S6 0.01661 0.998777 CUQ 3.0 2.3.16.2 0.7	LDC # <u>13757 (%</u> SDG # <u>5ee cov</u> el	<u>iu</u>	\ Initial and Con	/alidatin Fir tinuing Cali	Validatin Findings Worksheet I Continuing Calibration Calculation Verification	neet <u>lation Verific</u> a	tion	Page:of Reviewer: 2nd Reviewer:
The correlation coefficient (r) for the calibration of <u>CO1</u> was recalculated Calibration date: <u>YLU(IC</u> An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula: %R = Found X 100 Where, Found = concentration of each malyte in the analysis of the ICV or CCV source %R = Found X 100 Where, Found = concentration of each malyte in the ICV or CCV source True True = concentration of each analyte in the ICV or CCV source Initial calibration S1 1 0.0024 Accepta Initial calibration S1 1 0.0024 0.998771 0.998773 Initial calibration S2 2.5 0.00641 0.998774 0.998773 COV CUDA S5 2.0 0.01661 0.998774 0.998773 COV Calibration verification 1.0 1.856K Q.4 COV COV Calibration verification 1.0 1.856K Q.4 COV COV	Method: Inorganics, Me	ethod	34.0					
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula: %R = Found X 100 Where, Found = concentration of each analysis using the following formula: %R = Found X 100 Where, Found = concentration of each analysis of the ICV or CCV source True True = concentration of each analyte in the ICV or CCV source Type of analysis Analyte \$tandard Conc. (ug/l) Analyte \$standard Conc. (ug/l) Anaa Recalculated Reported Initial calibration \$standard Conc. (ug/l) Anaa Recalculated Accepta Initial calibration \$standard 0.00244 0.398771 0.398753 Or N/N Initial calibration CUM \$standard 0.006345 0.14097 Or N/N Calibration verification TCU 20 0.03291 0.398771 0.398753 Calibration verification TCU 20 0.14097 0 O	The correlation coefficient (r) for the calibr	ation of ClOy	was recalo	ulated.Calibration	date: <u> </u>		
where, sis Analyte Standard tion s1 C (C (S s6 s6 s6 s6 c (C (S s6 s6 s6 s6 s6 s6 s6 s6 s6 s6	An initial or continuing calib	oration verificat	ion percent rec	overy (%R) was	recalculated for ear	ach type of analys	is using the follow	ing formula:
Analyte Standard conc. (ug/l) Area Recalculated Reported $s1$ 1 0.0024 0.0024 r. or r ² r. or r ² r. or r ² $s2$ $s2$ 2.5 0.00841 0.998753 0.998753 $s3$ 5 0.001661 0.01661 0.998753 0.998753 $clOA$ $s3$ 5 0.01661 0.998753 0.998753 $clOA$ $s6$ 40 0.03291 0.998771 0.998753 $clOA$ $s6$ 40 0.01661 0.998771 0.998753 f 0.001661 0.01661 0.01661 0.998753 f 0.003291 0.03291 0.998753 0.77 f f 0.003291 0.998753 0.998753 f	%R = <u>Found X 100</u> True			Found = conce True = conce	ntration of each an ntration of each an	alyte <u>measured</u> ir alyte in the ICV or	the analysis of the CCV source	ICV or CCV solution
Analyte Standard conc. (ug/l) Area r or r^2 r or r^2 s1 1 0.0024 0.998771 0.998753 s2 2.5 0.00841 0.998771 0.998753 Cl(bi s4 10 0.01661 0.03291 0.998753 s5 2.0 0.03291 0.998771 0.998753 s6 40 0.14097 0.014097 1 fcU 2.0 0.6345 Qu/l 1 fcU 2.0 0.14097 1 1 1						Recalculated	Reported	Acceptable
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(N/N)
$\begin{array}{c ccccc} & & & & & & & & & & & & & & & & &$	Initial calibration		s1	٢	0.0024			
CIQ1 s3 5 0.01661 CIQ1 s4 10 0.03291 s5 20 0.06345 s6 40 0.14097 TCU 20 IS.GGS			s2	2.5	0.00841	0.998771	0.998753	
CIQ1 s4 10 0.03291 s5 20 0.06345 s6 40 0.14097 TCU 20 18,666 CCU 30 29,167 0			s3	5	0.01661).
s 20 0.06345 s 40 0.14097 ICU 20 18,666 CCU 30 29,167		CIQ	S4	10	0.03291			
se 40 0.14097 ICU 20 18,666 CCU 30 29,162 0		- 	s5	20	0.06345			
ICU ZO 18,686			s6	40	0.14097			
CCV 30 29.162 0	Calibration verification		ICU	20	18,666	hb	ſ	
	Calibration verification		ccv	30	29.162	97		\rightarrow
	Calibration verification							

LDC #: 2322/76 SDG #: 500000

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Reviewer: C Page:

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

concentration of each analyte measured in the analysis of the sample. For the matrix enlike calculation	Found = SSR (spiked sample result) - SR (sample result).	concentration of each analyta in the source
Found =		True =
Where,	•	
%R = Found x 100	True	

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

 $RPD = \frac{!S-D!}{!S+D)/2} \times 100 \text{ Where,} \qquad S = Original sample concentration$ (S+D)/2 D = Duplicate sample concentrationD = Duplicate sample concentrati

Acceptable (V/N) %R / RPD Reported 5 \overline{Q} Recalculated E 04H / 8% 107 True / D (units) rge//G 6,0995 2240.0 0.17 Found / S (unite) (MAKS 2001 Polo 0.10 (SSR-SR) Clor Elomont *.* ۲ Laboratory control sample Type of Analysis Matrix spike sample **Duplicate sample** Sample ID LCS Q 5

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

TOTCLC.6

LDC # SDG #

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	L	of	
Reviewer:	4	2-	
2nd reviewer:		12	\sim

reported with a positive detect were

METHOD: Inorganics, Method

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".Y N N/AHave results been reported and calculated correctly?N N/AAre results within the calibrated range of the instruments?

SECON

Y) N N/A Are all detection limits below the CRQL?

Recalculation: Concentration = 0,00371+0,0 Area - offset) Prop Factor = 0.01578/18 0.003 1000 % solid (0.899)

#	Sample ID	Analyte	Reported Concentration	Calculated Concentration (Mg (G)	Acceptable (Y/N)
	l	Clay	0.015	0.015	Ч
				C. All Contractions	
· · ·					
		<u> </u>		· · ·	
			<u> </u>	-	

Note:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility, PCS, Henderson, Nevada
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Collection Date: April 23, 2010

LDC Report Date: June 4, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2836-1

Sample Identification

SSAM3-02-1BPC SSAM3-02-5BPC SSAJ2-01-1BPC SSAJ2-01-5BPC SSAM3-02-1BPC_FD SSAM3-02-1BPCMS SSAM3-02-1BPCMSD SSAM3-02-1BPCDUP

Introduction

This data review covers 8 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No perchlorate were found in these blanks.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2836-1	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

Samples SSAM3-02-1BPC and SSAM3-02-1BPC_FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentrat	lion (mg/Kg)	RPD	Difference		
Analyte	SSAM3-02-1BPC	SSAM3-02-1BPC_FD	(Limits)	(Limits)	Flags	A or P
Perchlorate	0.022	0.021	-	0.001 (≤0.012)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2836-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2836-1	SSAM3-02-1BPC SSAM3-02-5BPC SSAJ2-01-1BPC SSAJ2-01-5BPC SSAM3-02-1BPC_FD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-2836-1

No Sample Data Qualified in this SDG

Trone	ox Northgate	Henders	on
VALIDATION	COMPLETEN	VESS WC	RKSHEET

Stage 2B

SDG #: 280-2836-1 Laboratory: Test America

LDC #: 23252G6

Date: 6-3-10 Page: \of) Reviewer: C 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
١.	Technical holding times	A	Sampling dates: 4/23/10
lla.	Initial calibration	A	
llb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/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	SW	(1,5)
x	Field blanks	ND	FB=FB-04072010-RZD, FB-04BZ010-RIGA-RZ (250-22162) (250-2400-2)
Note:	A = Acceptable ND = N	lo compound	(2560-22.16-2) (2-50-2400-2) s detected D = Duplicate

TB = Trip blank EB = Equipment blank

Note: A = Acceptable N = Not provided/applicable

SW = See worksheet

Validated Samples: 30:1

1	SSAM3-02-1BPC	11	rog	21		31	
2	SSAM3-02-5BPC	12	······································	22		32	
3	SSAJ2-01-1BPC	13		23		33	
4	SSAJ2-01-5BPC	14		24		34	
5	SSAM3-02-1BPC_FD	15	<u></u>	25	· · · · · · · · · · · · · · · · · · ·	35	
6	SSAM3-02-1BPCMS	16		26		36	
7	SSAM3-02-1BPCMSD	17	······································	27		37	
8	SSAM3-02-1BPCDUP	18		28	· · · · · · · · · · · · · · · · · · ·	38	
9		19		29		39	
10		20		30		40	

R = Rinsate

FB = Field blank

Notes:

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	of(
Reviewer:	_ QZ
2nd Reviewer:	\sim

Inorganics, Method: See Cover



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

	Concentrati	on (mg/Kg)				Qualification	
Analyte	1	5	RPD (≤50)	Difference	Limits	Qualification (Parent only)	
Perchlorate	0.022	0.021		0.001	(≤0.012)		

V:\FIELD DUPLICATES\FD_inorganic\23252G6.wpd

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: April 26, 2010

LDC Report Date: June 7, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2879-1

Sample Identification

SSAJ2-02-1BPC SSAJ2-02-5BPC** SSAR6-04-1BPC SSAR6-04-5BPC** SSAJ2-02-1BPCMS SSAJ2-02-1BPCMSD SSAJ2-02-1BPCDUP

**Indicates sample underwent Stage 4 review

1

Introduction

This data review covers 7 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB04062010-RZB (from SDG 280-2131-2) were identified as field blanks. No perchlorate was found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	SSAR6-04-1BPC SSAR6-04-5BPC**

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

IV. Matrix Spike/Matrix Spike Duplicates

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

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) were within QC limits.

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2879-1	All analytes reported below the PQL.	J (all detects)	A

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

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2879-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2879-1	SSAJ2-02-1BPC SSAJ2-02-5BPC** SSAR6-04-1BPC SSAR6-04-5BPC**	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2879-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2879-1

No Sample Data Qualified in this SDG

LDC #:_	23252H6				
SDG #:	280-2879-1				
Laboratory: Test America					

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B / 4

Date: 6-3-10
Page: <u>1_</u> of
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

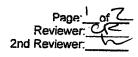
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation	Area				Comments	
1.	Technical holding times			A	Sampling	dates: 4/26/10	
lla.	Initial calibration			A			
llb.	Calibration verification			A			
- 111.	Blanks			A			
IV	Matrix Spike/Matrix Spike D	ouplicat	es	A	msh	2	
V	Duplicates			ち	ap		
VI.	Laboratory control samples			A	Lis	•	
VII.	Sample result verification			A	Notr	eviewed for ZB	
VIII	Overall assessment of data			A			
IX.	Field duplicates			\overline{N}		· · · · · · · · · · · · · · · · · · ·	
Lx	Field blanks			SW	F8= F	<u>B-04072010-RZD, FB040</u> (280-2216-2) (280	62010-RZB
Note: Valida	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples:		R = Rin	o compound: sate eld blank		D = Duplicate TB = Trip blank EB = Equipment blank	
1	SSAJ2-02-1BPC	11	POS		21	31	
2	SSAJ2-02-5BPC	12			22	32	
3	SSAR6-04-1BPC	13			23	33	
4	SSAR6-04-5BPC	14			24	34	
5	SSAJ2-02-1BPCMS	15			25	35	
6	SSAJ2-02-1BPCMSD	16			26	36	
7	SSAJ2-02-1BPCDUP	17		· · · · · · · · · · · · · · · · · · ·	27	37	
8		18			28	38	
9		19			29	39	
10		20			30	40	

Notes:

LDC # 23252Hb SDG # See Caren

VALIDATION FINDINGS CHECKLIST



Validation Area	Yes	No	NA	Findings/Comments
Cleaning United Interest Control of Control				
All technical holding times were met.	1	1		
Coolar temperature criteria was met.				
Were all instruments calibrated daily, each set-up time?	\vdash			
Were the proper number of standards used?	arproptom			
Were all initial calibration correlation coefficients > 0.995?	\leq			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				·
Were titrant checks performed as required? (Level IV only)	_		1	
Were balance checks performed as required? (Level IV only)				
Was a method blank associated with every sample in this SDG?	\leq			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		1	-	
WAWATAS SIGNATION STREAM THE THE PROPERTY AND A DESCRIPTION OF THE PROPERT				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	7			
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	\checkmark			
			ta ne manto	
Was an LCS anayized for this SDG?	\square			·
Was an LCS analyzed per extraction batch?	Δ			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Cashie Association and Cuality Canada				
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?				

Method: Inorganics (EPA Method Second)

LDC #: 2325246 SDG #: See 00 00

VALIDATION FINDINGS CHECKLIST

۰.	Page:	Zof Z
	Reviewer:	GE
2nd	Reviewer:	$\overline{\mathcal{N}}$

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Ventication				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	-	r		
Were detection limits < RL?	-	F		
MB. Overall assessment of date				
Overall assessment of data was found to be acceptable.	-	n		
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		-		
Target analytes were detected in the field duplicates.		·	1	
X. Field blenks				
Field blanks were identified in this SDG.	1			
Target analytes were detected in the field blanks.	\square			

LDC #: <u>23204A6</u> SDG #: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: _____of __ 8 Reviewer: ______2nd Reviewer: ______

2 		her:	
Cover ed in this SDG	I sample units: mg/Kg Soil factor applied _10x	/ Rinsate / Ot Action Limit	
METHOD: Inorganics, EPA Method See Cover Y N N/A Were field blanks identified in this SDG? V N/A Merce field blanks identified in this SDG?	Blank units: ug/L Associated sample units: mg/Kg Sampling date: <u>4/6/10</u> Soil factor applied <u>10x</u>	Field blank type: (circle one) [field Blank]/ Rinsate / Other. Analyte Blank ID Action Limit	
METHOD: Inorganic Y N N/A We V AI N/A We	Blank units: <u>ug/L</u> Ass Sampling date: <u>4/6/10</u>	Field blank type: ((Analyte	

Reason Code: bf

Associated Samples: 3,4

						-	
	ntification						
111000	Sample Identification						
							-
		Nocida IS C>Of					
		NOGP					
	Action Limit		9.2				
lora biante sport for an and a strain biante the state of the	Blank ID	FB04062010-RZB (SDG#: 280-2131- 2 3)	92				
Lod Summer Shou	Analyte		CIO4				

FB04062010-RZB-CIO4.wpd

JANTER STREET	<u>u</u>	Initial and Con	<u>ntinuing Calibration Calculatio</u>	Continuing Calibration Calculation Verification	<u>Ilation Verifica</u>	ation	Reviewer:
Method: Inorganics, Method	ethod	314,0					2nd Reviewer: _/
The correlation coefficient (r) for the calibration of \underline{CV}	r) for the calib	ration of <u>CIO</u> J	was recal	was recalculated.Calibration date:	r date: <u>۲/۲/ ال</u>		
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:	oration verifica	tion percent rec	overy (%R) was	s recalculated for e	each type of analys	is using the follov	ving formula:
%R = <u>Found X 100</u> True		Where,	Found = conce True = conce	intration of each a intration of each a	= concentration of each analyte <u>measured</u> in the analysis = concentration of each analyte in the ICV or CCV source	the analysis of th r CCV source	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration of each analyte in the ICV or CCV source
					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r ²	r or r²	(V/N)
Initial calibration		s1	~	0.0025			
		s2	2.5	0.00841	0.998765	0.998771	·
		s3	5	0.01661)-
		s4	10	0.03291			
		s5	20	0.06345			_
		s6	40	0.14097			
Calibration verification		ICU	02	18,890	વન	l	
Calibration verification		CCNO	0	9,350	٩٦	J	
Calibration verification	\rightarrow	05N30	R	B0:62	47	ì	\rightarrow

Contraction of the

LDC #: 23252/45 Second SDG #:

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**



METHOD: Inorganics, Method Second

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

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source. Found = True = Where, %R = Found x 100 True

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

Original sample concentration) | | ທີ່ | $RPD = \underline{13-D1} \times 100 \text{ Where,} (S+D)/2$

Dupticate sample concentration

					4		
			Found / S	4) . 	Recalculated	Reported	
Sample ID .	Type of Analysis	Element	(units)	(units)	0dH / NW	CGR / RPD	Acceptable (V/N)
Laboi	Laboratory control sample						
i SJ		CQJ	0,0844	Q660.0	85	58)~
							-
Matur	Matrix spike sample		(SSR-SR)				
			5 J	ר לי ע	G	5	
·		·				Ĵ.	
Dupt	Duplicate sample				·		
		\rightarrow	60	6 2	7	7)-
		<u>ج</u>) -	•	< _	•

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

TOTCLC.6

LDC # SDG #

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	Lot
Reviewer:	C/2
2nd reviewer:	

reported with a positive detect were

METHOD: Inorganics, Method __

Secarel

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". $\frac{V N N/A}{N N N/A}$ Have results been reported and calculated correctly? Are results within the calibrated range of the instruments?

Y N N/A Y N N/A Are results within the calibrated range of the instruments? Are all detection limits below the CRQL?

Compound (analyte) results for <u>CLOY</u> recalculated and verified using the following equation:

Concentration =

Offset) (DF)(Pro Ecro) Solid

Recalculation (ioo)(io) 0.05121 +0.0008 = 17 mg/kg 1000 (0,92)

#	Sample ID	Analyte	Reported Concentration (NY KS	Calculated Concentration	Acceptable (Y/N)
	2	ClOy	18	5	Ĭ
		· · · · · · · · · · · · · · · · · · ·			
 	·	·			
 					
		· · · · · · · · · · · · · · · · · · ·			

Note:

Laboratory Data Consultants, Inc. Data Validation Report

Soil

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date: April 27, 2010

LDC Report Date: June 7, 2010

Matrix:

Parameters: Perchlorate

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2960-1

Sample Identification

SSAR7-02-1BPC SSAR7-02-5BPC SSAR7-03-1BPC SSAR7-03-5BPC SSAR7-04-1BPC SSAR7-04-5BPC

1

Introduction

This data review covers 6 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

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

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

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04062010-RZB	4/6/10	Perchlorate	92 ug/L	All samples in SDG 280-2960-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SSAR7-02-1BPC	Perchlorate	0.17 mg/Kg	0.17J+ mg/Kg
SSAR7-02-5BPC	Perchlorate	0.24 mg/Kg	0.24J+ mg/Kg
SSAR7-03-1BPC	Perchlorate	1.6 mg/Kg	1.6J+ mg/Kg
SSAR7-03-5BPC	Perchlorate	1.1 mg/Kg	1.1J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SSAR7-04-1BPC	Perchlorate	0.58 mg/Kg	0.58J+ mg/Kg
SSAR7-04-5BPC	Perchlorate	0.48 mg/Kg	0.48J+ mg/Kg

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 280-2960-1	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-2960-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2960-1	SSAR7-02-1BPC SSAR7-02-5BPC SSAR7-03-1BPC SSAR7-03-5BPC SSAR7-04-1BPC SSAR7-04-5BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-2960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-2960-1

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-2960-1	SSAR7-02-1BPC	Perchlorate	0.17J+ mg/Kg	A	bf
280-2960-1	SSAR7-02-5BPC	Perchlorate	0.24J+ mg/Kg	A	bf
280-2960-1	SSAR7-03-1BPC	Perchlorate	1.6J+ mg/Kg	А	bf
280-2960-1	SSAR7-03-5BPC	Perchlorate	1.1J+ mg/Kg	A	bf
280-2960-1	SSAR7-04-1BPC	Perchlorate	0.58J+ mg/Kg	A	bf
280-2960-1	SSAR7-04-5BPC	Perchlorate	0.48J+ mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 23252J6 SDG #: 280-2960-1

Laboratory: Test America

Date: 6-3-10 Page: __of) Reviewer: CA 2nd Reviewer: \sim

<u>____</u>

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/27/10
lla.	Initial calibration	A	
lib.	Calibration verification	A	
111.	Blanks	R	
IV	Matrix Spike/Matrix Spike Duplicates	N	client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
x	Field blanks	ŚW	FB= FB04062010-RZB (280-2131-2)

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples: حصرا

1	SSAR7-02-1BPC	11	PBS	21		31	
2	SSAR7-02-5BPC	12		22		32	
3	SSAR7-03-1BPC	13		23		33	
4	SSAR7-03-5BPC	14		24		34	
5	SSAR7-04-1BPC	15		25		35	
6	SSAR7-04-5BPC	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29	· · · · · · · · · · · · · · · · · · ·	39	
10		20		30		40	

Notes:

VALIDATION FINDINGS WORKSHEET Field Blanks

ð Page:<u>\</u> Reviewer:_(2nd Reviewer:_

METHOD: Inorganics, EPA MethodSee CoverX N N/AWere field blanks identified in this SDG?Y) N N/AWere target analytes detected in the field blanks?Blank units: ug/LAssociated sample units: mg/KgSampling date:4/6/10Field blank type: (circle one)(Field Blank) Rinsate / Other:

Reason Code: bf

Associated Samples: M 1

	_			 	 	
	Sample Identification					
		ې	0.4857			
		5	0.5834			
		Т	0,1754 0,2454 1,654 1.1 34 0.5834 0,4837			
		r	1,63+		-	
		7	0,24 54			
		1	0.1754			
	Action Limit		9.2			
lein biair is be failer aire aire aire aire aire aire aire	Blank ID	FB04062010-RZB (SDG#: 280-2131- 2 3)	92			
leiu ulalin type.	Analyte		CI04			

FB04062010-RZB-CIO4.wpd