

LABORATORY DATA CONSULTANTS, INC.

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

Northgate Environmental Management, Inc.

June 10, 2010

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

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

Data Validation

Dear Ms. Arnold,

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

LDC Project # 23252:

SDG#

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

Semivolatiles, Chlorinated Pesticides Metals, Perchlorate

280-2960-1, 280-2995-4, 280-3059-1

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,

Operations Manager/Senior Chemist

LDC #: 23252

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

Tronox Northgate Henderson Worksheet

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

Attachment 1

	Stage 2B/4				֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝	741	3,7	770	5	LDC #23252 (Tronox		シニト	5 5	gau	Ĭ ŏ	end	ers	o	LLC-Northgate, Henderson NV / Tronox PCS	Ē	ono	Ă	SS											
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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)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

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

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)	А	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	А	bl
280-2400-2	EB-04132010-RIG3-RZD	Di-n-octylphthalate	1.6U ug/L	А	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

LDC #: 23252C2a	VALIDATION COMPLETENESS WOR
SDG #: 280-2400-2	Stage 2B
Laboratory: Test America	-

Date: 6/12/16
Page: 1 of 1
Reviewer: 0/6
2nd Reviewer: 1

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 4 / 13 / 10
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RSD 17 COV/100 6 25 2
IV.	Continuing calibration/ICV	A	CON/100 6252
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	Us 10
lX.	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 =

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	

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
G. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	L.L. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzył alcohol
J. N-Nitroso-di-n-propylamine⁴	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS, Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	ບບບ
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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23262	4
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

Page: ___lof_ 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 "N/A".

Was a method blank analyzed for each matrix?

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

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

Blank extraction date: 4/6/16 Blank analysis date: 4 Y/N N/A

(97) Sample Identification A II Associated Samples: 4 <u>ق</u> نــ 305A-A MR 280-11 Blank ID 1.65 F 下 下 Conc. units: 149 /L Compound

Blank extraction date:

Blank analysis date:

Conc. units

Associated Samples:

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	Sample Identification				
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	Blank ID				
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⁵x Phthalates 2x all others

23 257 626 LDC #:_ SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

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Page:	Reviewer:	2nd Reviewer:

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

2 Se Sample Identification Associated Samples: Sampling date: 4/12/ro
Field blank type: (circle one) Field Blank ID

Compound

Were target compounds detected in the field blanks?

Were target compounds detected in the field blanks?

Associated sample units: NA

Sampling date: 4/12/ro

Field blank type: (circle one) Field Blank ID

Compound Field blank ID

Sampling blank ID

Compound Blank ID

Sampling blank ID

Sampli و نـ ص نــ 下午午 印形 Compound CROL

Associated sample units:_ Blank units:

Sampling date:

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

Associated Samples:

	:			
	Management		A CONTRACTOR OF THE CONTRACTOR	CROL

5x Phthalates 2x All others

FBLKASC2tronox.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 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)	Α

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

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

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)

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 Henderson VORKSHEET VA

LIDATION	COMPLETENESS	۷
	Stage 28 4	

Date: 6/62/10 Page: 1of) Reviewer: NG 2nd Reviewer:

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

23252I2a

Laboratory: Test America

280-2931-2

LDC #:___

SDG #:

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

	Validation Area		Comments
 	Technical holding times	A	Sampling dates: 4/27/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 KED 17 CW/W 625 Z
IV.	Continuing calibration/ICV	A	CW/W 625 2
V.	Blanks	A	
VI.	Surrogate spikes	Á	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	Client spec
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards		
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	RZ FB = FB-0407 2010 - 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:

CALL

	<u> </u>			 ***************************************
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

LDC #: 23 V52 Ing SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: _\ of _2 Reviewer: __\ \frac{1}{\sqrt{\chi}} 2nd Reviewer: __\ \frac{1}{\sqrt{\chi}}

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)				
Validation Area	Yes	No	NA	Findings/Comments
J. Technical holding times				DDAY HAND SALES
All technical holding times were met.				
Cooler temperature criteria was met.				grapheters and grapheters are a second
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				A Comment of the Comm
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?			<u> </u>	
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	/			
IV. Continuing ealibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	/			
V. Blanks				And the state of t
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			1	Secretary of the second
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 (A Constant of the control of the cont				AND THE SECOND S
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			,	
VIII. Laboratory portifol samples				
Was an LCS analyzed for this SDG?	<u> </u>			

LDC#: 33 25 Tra SDG#: Sce Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1/6
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		и и — Г		
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			1	
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?				Service 4
XII. Compound quantitation/CRQLs	/	()	1	A Company of the Comp
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	_			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)	nj.			A. Carlotte and the second sec
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				And the second s
System performance was found to be acceptable.	/	<u> </u>		
XV Overall assessment of data 1987	1.0			$\frac{\sum_{i=1}^{N} \sum_{j=1}^{N} \frac{1}{N_{i}} \sum_{j=1}^{N} $
Overall assessment of data was found to be acceptable.	/	1		
XVi-Field duplicates		T /	1	
Field duplicate pairs were identified in this SDG.	-	 	-	
Target compounds were detected in the field duplicates.				
XVII. Field blanks		T		
Field blanks were identified in this SDG.	<u> </u>			
Target compounds were detected in the field blanks.	<u> </u>		<u> </u>	

VALIDATION FINDINGS WORKSHEET

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

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

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

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LDC#:	SDG#: C

VALIDATION FINDINGS WORKSHEET Field Blanks

ot	32	1
Page:	Reviewer:	2nd Reviewer:

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

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

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

Blank units: "5 / Associated sample units: "6 / Associated units: "6 / Associated units: "6 / Associated units: "6 / Associated units: "6 / Associate V N N/A Blank units:

Sampling date: 4/67/P. Field Blank Rinsate / Other.

Sample Identification Associated Samples: FB 72 X FB-04672910-RZD Blank ID y, Y EFF Compound CROL

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

Associated Samples:

ıtion				
Sample Identification				
S				
Blank ID				
Compound				
				 CROL

5x Phthalates 2x All others

LDC# 22 XVIX SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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:

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

 A_x = Area of Compound average RRF = sum of the RRFs/number of standards

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

X = Mean of the RRFs

%RSD = 100 * (S/X)

#

S= Standard deviation of the RRFs, C_x = Concentration of compound,

Recalculated %RSD 13.49 8.89 13.97 4.35 5.44 4.70 Reported %RSD 13.5 14.0 8.9 4.3 5.4 4.7 Average RRF Recalculated 0.6818 0.2705 1.1835 1.1204 1.3629 1.0324 (Initial) Average RRF Reported 0.6818 0.2705 1.1204 1.3629 1.1835 (Initial) Recalculated 50 std) 1.1079 1.3779 0.2590 1.1960 0.6731 1.0611 RRF Reported (50 std) 1.1079 1.3779 0.2590 1.1960 0.6731 1.0611 RRF (183) (182) (181) (184) (182)(186) Compound (Internal Standard) Hexachlorobenzene Benzo(a)pyrene Naphthalene 1,4-Dioxane Chrysene Fluorene 4/20/2010 Calibration Date Standard ID MSS D

Area IS	262046	997667	671030	1219394	1513952	1309806
Area cpd	220464	1381644	1155733	394826	2008107	1958223
nc IS/Cpd	40/20	40/20	40/20	40/50	40/20	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	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.

LDC # 77 X Trace SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page 1 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)

RRF = continuing calibration RRF

ave. RRF = initial calibration average 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 (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	%D
-	D4531	05/01/10	(iS1)	0.6818	0.6135	0.6135	10.0	10.0
		1	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 (IS6)	1.1835	1.2509	1.2509	5.7	5.7

Compound (Reference IS)	S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	384024	312973
Naphthalene	(182)	40/80	2646759	1152826
Fluorene	(IS3)	40/80	2305108	816564
Hexachlorobenzene	(184)	40/80	809868	1444254
Chrysene	(185)	40/80	3940883	1847115
Benzo(a)pyrene	(9SI)	40/80	3862774	1543947

LDC#: 3252 I 26 SDG#: Src Cover

VALIDATION FINDINGS WORKSHEET <u>Surrogate Results Verification</u>

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	81.2	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	1	106.9	7/	71	۵
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

LDC# 29252 129

SDG #: See Corr

VALIDATION FINDINGS WORKSHEET

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

Laboratory 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

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

115 280 - 123 57/2-4

									-	000 1130
	Add	Added	Concer	Concentration						Caa
Compound	/GM)	(B)		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	rercent Recovery	ecovery	rercent necovery	(ecovery		
	SO	U 1 CSD	SD I	U I CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propy/amine										
4-Chloro-3-methylphenol										
Acenaphthene	0952	47	2140	ZV.	84	84				
Pentachlorophenol										
Pyrene	7,60	_	2530	_~	66	99				
							V			

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 #:_	つろ2	52	I	26
SDG #:	Sce	Con	•/	

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof1_
Reviewer:	SVC
2nd reviewer:	9

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

Y N N/A Y N N/A Were all reported results recalculated and verified for all level IV samples?

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

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

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

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

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

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

V_I = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (uI)

Df = Dilution Factor.

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

Example:

Sample I.D. #

Conc. = $\frac{(80648)(40)(1m!)(1m0)(}{(1312471)(0.2705)(31.49)(0.952)(}$

= 304.0

2300 45 kg

2.0	= Factor of 2 to accoun	t for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
<u> </u>				.,	
		A		:	
				<u> </u>	
ļ					
-					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 28, 2010

LDC Report Date:

June 4, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

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

Sample Identification

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.
- 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)	А	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

DC #:	23252K2a	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2995-4	Stage 2B /4
aborato	ry: Test America	

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
H.	GC/MS Instrument performance check	A	,
III.	Initial calibration	A	2 RSD VY
IV.	Continuing calibration/ICV	A	ca /10 € 25 2
V.	Blanks	Α	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	A	Client SSAQ3-01-7BPC
VIII.	Laboratory control samples	A	us
IX.	Regional Quality Assurance and Quality Control	, N	
X.	Internal standards	A	
XI.	Target compound identification	μА	
XII.	Compound quantitation/CRQLs	» A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	ΝA	
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

ND = No compounds detected

R = Rinsate

FB = Field blank

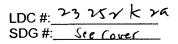
D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: Soil

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



VALIDATION FINDINGS CHECKLIST

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				
Did the laboratory perform a 5 point calibration prior to sample analysis?	_			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	/			
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?				***
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		_		
VI. Surrogate spikes				
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				en e
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences	/			
(RPD) within the QC limits? VIII Laboratory control samples				
Was an LCS analyzed for this SDG?				

LDC #: Y3 257 k 29 SDG #: See Gover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 56
2nd Reviewer: 6

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				A STATE OF THE STA
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)	lane.			Contracting the State of the St
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.				
XVI: Field duplicates:				Don't was a second second
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. Fluoranthena**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrane	000. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT. 1,4- Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)™	FFF. Di-n-octylphthalate**	uuu, octachlorostyrune
N. 2-Nitrophenol™	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

LDC# 73757 X24 SDG #: Oce C.

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

1 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:

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

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

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

#	<u>.</u> -				Reported	Recalculated	Reported	Recalculated	керопеа	Recalculated
#		Calibration			RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
	Standard ID	Standard ID Date	Compound (Internal Standard)	dard)	(50 std)	(50 std)	(Initial)	(Initial)		
-	ICAL	5/4/2010	5/4/2010 1,4-Dioxane	(181)	0.6700	0.6700	0.6718	0.6718	4.8	4.84
	MSS Y		Naphthalene	(182)	1.0419	1.0419	0.9990	0:9990	8.0	8.04
			Fluorene	(183)	1.3468	1.3468	1.3058	1.3058	8.0	8.02
			robenzene	(IS4)	0.1996	0.1996	0.1947	0.1946	2.8	2.82
			Chrysene	(185)	1.0651	1.0651	1.0509	1.0509	7.9	7.92
			Benzo(a)pyrene	(981)	1.1462	1.1462	1.1042	1.1042	3.3	3.28

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

1263104

1401828

347342

290884

Area IS

Area cpd

nc IS/Cpd

780352

1313767 1775212

1343097

335135 1866391 1809781

40/20

40/20 40/50

1363095

40/20 40/20

40/20

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

LDC # 047K2 k rq SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page $\frac{1}{2}$ of $\frac{1}{2}$ 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

1		Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
	Standard ID		Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	0%	%D
11	Y2041	05/05/10	(IS1)	0.6718	0.6326	0.6326	5.8	5.8
			Naphthalene (IS2)	0.9990	0.9901	0.9901	6.0	6.0
1			Fluorene (IS3)	1.3058	1.2805	1.2805	1.9	1.9
1			Hexachlorobenzene (IS4)	0.1947	0.1995	0.1995	2.5	2.5
1			Chrysene (IS5)	1.0509	1.0427	1.0427	8.0	0.8
1			Benzo(a)pyrene (IS6)	1.1042	1.1500	1.1500	4.1	4.1
11								
1								
1								
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	(183)	40/80	2525517	986110
Hexachlorobenzene	(184)	40/80	667483	1672491
Chrysene	(185)	40/80	3658447	1754242
Benzo(a)pyrene	(186)	40/80	3746932	1629142

12.

LDC# 33257 Kre SDG# Sre Cover

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:_	lof_1_
Reviewer:	JV6
2nd reviewer:	O'
•	7

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	197	67.0	67	67	0
2-Fluorobiphenyl		69.2	4 9	6'9	
Terphenyl-d14	-	83.5	83	83	
Phenol-d5	150	109.7	73	73	
2-Fluorophenol		104.1	49	69	
2,4,6-Tribromophenol	T T	126.3	24	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					

Sample ID:

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

LDC# 2925742A

SDG #: See Corer

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

Reviewer: M.

Page: lof 2nd Reviewer:

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

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

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

200-13949/22-A ই LCS/LCSD samples: __

	<i></i>	jike	š	ike	<u> </u>	CS	<u>ਰ</u>	csp	ICSII	CS/LCSD
Compound	, A &)	Added (Mg / Kc)	Conce (7x	Concentration (VK / IC)	Percent Recovery	ecovery	Percent Recovery	\ecovery	RPD	ρ
	1.03	0 LCSD	SOL	l CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol	·									
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2530	XX	1776	47	22	R				
Pentachlorophenol										
Pyrene	X30	+	1870		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 #: 23 x5x tra SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u> of 1</u>
Reviewer:	JV6
2nd reviewer:	L
•	7

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

/	\neg		
/	Y	Ν	N/A
(\overline{Y}	N	N/A
l	ァ		

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

Conce	ntratio	n = (<u>A_)(l_)(V_i)(DF)(2.0)</u> (A _b)(RRF)(V _o)(V _i)(%S)	Example:
A_{x}	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. # 7,:
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	
l _s	=	Amount of internal standard added in nanograms (ng)	$ conc. = \frac{(85337)(40)(1m/)(1003)(1345)(0.1447)(30.38)(0.924)}{(134537)(0.1447)(30.38)(0.924)}$
V_{o}	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	1, 10, 10, 17, 10, 19, 0, 924
V_i	=	Volume of extract injected in microliters (ul)	= 465.6
V_{t}	=	Volume of the concentrated extract in microliters (ul)	
Df	=	Dilution Factor.	~ 470 us/f.
%S	=	Percent solids, applicable to soil and solid matrices only.	1 7

2.0	= Factor of 2 to accoun	t for GPC cleanup				
#	Sample ID	Compound		Reported Concentration ()	Calculated Concentration ()	Qualification
					•	
						.,,,,,
			İ			
		, , , , , , , , , , , , , , , , , , , ,				-
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-+						·
1						

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)	А

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 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 VALIDATION COMPLETENESS WORKSHEET

LDC #:	23252LZa	- AMPIDATION COMILEPTENCO
SDG #:_	280-3059-1	Stage 2B/4
Laborato	ry: Test America	<u> </u>

Page: 1 of 1 Reviewer: 2nd Reviewer:

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

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

	Validation Area		Comments
l.	Technical holding times	Æ	Sampling dates: 4 /29 /10
II.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 ksp r~
IV.	Continuing calibration/ICV	A	ca/10 = 25 }
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	À	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB04062010-RZB (from 280-2/31-2)

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: Coil

* u	vel 4 301					
1	SSAQ3-01-1BPC	17	MB 280 - 13949 S-A	21	3	31
2	SSAQ3-01-3BPC	12	•	22	3	32
3	SSAQ3-01-5BPC	13		23	3	33
4	SSAQ3-01-7BPC	14		24	3	34
5	SSAQ3-01-9BPC **	15		25	3	35
6	SSAQ3-01-7BPCMS	16		26	3	36
7	SSAQ3-01-7BPCMSD	17		27	3	37
8		18		28	3	38
9		19		29	3	39
10		20		30	4	40

LDC #: 23252 L 29 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2 Reviewer: 306 2nd Reviewer: 1

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EFA SW 846 Method 82700)				
Validation Area	Yes	No	NA	Findings/Comments
Technical holding times				
All technical holding times were met.		-		
Cooler temperature criteria was met.				A STATE OF THE STA
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
III, Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Was a curve fit used for evaluation?			<u> </u>	
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	/			
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?				
IV. Continuing calibration	1		ī	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	_			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		-		
V. Blanks	Y 9			
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.		/	<u> </u>	
VI. Surrogate spikes	T			Applications of the population of the terms
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				MCG Transfer of the SAME AND
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	T	T		
Was an LCS analyzed for this SDG?		<u> </u>	<u> </u>	

LDC #: 2325 25 29 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 506
2nd Reviewer: 9

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	7			
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?				September 1
X Internal standards		r		
Were internal standard area counts within -50% or +100% of the associated calibration standard?	_			
Were retention times within ± 30 seconds from the associated calibration standard?				
XI. Target compound identification		1		
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	/		<u> </u>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/		<u> </u>	
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/	_		
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)	**			And and the first of the second secon
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?				-
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/	1	
XIV. System performance		12	T	
System performance was found to be acceptable.		1		
XV Overall assessment of data and the second of the second				
Overall assessment of data was found to be acceptable.		1		
XVI Field duplicates				en Germania (h. 1888) eta 1888 e
			1	
Field duplicate pairs were identified in this SDG.	+	+	+,	
Target compounds were detected in the field duplicates.				
XVII. Field blanks	1	7	-	137 Marie Barrella de la Companya d T
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.	\perp	<u>Ł</u>		

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: >3 25 / L24 Sec Corry

SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

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

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

Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Blank units: W L Associated sample units: W | Ics

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

Associated Samples:

Sample Identification #10 X ۲ <u>₽</u> FB04062d10- RZB Blank ID 2.7 在在在 Compound

Associated sample units: Blank units:

CROL

Sampling date:

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

Associated Samples:

Sample Identification Blank ID Compound

5x Phthalates 2x All others

CROL

LDC # 2227 129 SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

ا ار ار Page:

Reviewer: 2nd Reviewer:

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

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

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

 A_x = Area of Compound

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

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

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

X = Mean of the RRFs

ated

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculat
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID	Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)		
	ICAL	Ш	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	0666.0	0.9990	8.0	8.04
			Fluorene (IS3)	1.3468	1.3468	1.3058	1.3058	8.0	8.02
			penzene	0.1996	0.1996	0.1947	0.1946	2.8	2.82
				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	
nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	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	2066'0	1.1311
160.00	0.6321	0.9206	1.1894	0.1905	9656.0	1.1027
200.00	0.6558	0.8811	1.1406	0.1897	0.9324	1.0775
II ×	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.

LDC # アランなアレンタ SDG # See Cover

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:

ave. RRF = initial calibration average RRF

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

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

Ax = Area of compound

Ais = Area of associated internal standard RRF = continuing calibration RRF

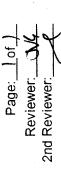
Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)		(Initial RRF)	(CC RRF)	(CC RRF)	%D	%D
-	Y2041	05/05/10	1,4-Dioxane	(IS1)	0.6718	0.6326	0.6326	5.8	5.8
			Naphthalene	(182)	0666.0	0.9901	0.9901	6.0	6.0
			Fluorene	(IS3)	1.3058	1.2805	1.2805	1.9	1.9
			Hexachlorobenzene	(184)	0.1947	0.1995	0.1995	2.5	2.5
			Chrysene	(185)	1.0509	1.0427	1.0427	0.8	0.8
			Benzo(a)pyrene	(186)	1.1042	1.1500	1.1500	4.1	4.1

Compound (Reference IS)	IS)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	529970	418891
Naphthalene	(182)	40/80	3249540	1640967
Fluorene	(183)	40/80	2525517	986110
Hexachlorobenzene	(IS4)	40/80	667483	1672491
Chrysene	(185)	40/80	3658447	1754242
Benzo(a)pyrene	(9SI)	40/80	3746932	1629142

LDC #: 29xcz L2q SDG #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET



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

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Sample concentation

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

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

MS/MSD samples:

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

	Spil	9	Sample	Spiked	ample	Matrix Spike	Spike	Matrix Spike Duplicate	Duplicate	GSW/SW	SD
Compound	Added (18)	1	Concentration (1/5 /E)	Concentration	tration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
•	MS	O MSD	0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2770	2750	Q	2200	2090	12	79	2/2	2,0	þ	h
Pentachlorophenol						-	-				
Pyrene	2770	2750	164	3550	2660	%	90	=	9	4	4

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

LDC#: 73257 L29
SDG#: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	<u>lof_1</u>
Reviewer:_	377.
2nd reviewer:	1
	r

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: # 5

Jumpie ID:	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	(9)	74.1	74	74	0
2-Fluorobiphenyl	l l	76.5	76	76	
Terphenyl-d14		89.7	90	90	
Phenol-d5	10)	113.4	76	76	
2-Fluorophenol		109.6	73	73	
2,4,6-Tribromophenol		132.97	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					

Sample ID:

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

LDC #: 22 124 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: lof 1

Reviewer: 3/6 2nd Reviewer:__

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

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

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples: __

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

122-A 280- 13949 S

	Sp	ike	ďS	Spike	31	CS	ä	l CSD	I CS/I	CS/I CSD
Compound	Ad (105)	Added (US)	Concer (MS)	Concentration (セタ/トリ	Percent Recovery	Recovery	Percent Recovery	\ecovery	RF	RPD
	1.08	l CSD	1.CS	l CSD	Reported	Recalc.	Reported	Recalc	Reported	Recalculated
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
	2530	\$ PA	1770	έΛ Α	70	70				
Pentachlorophenol										
	25.30		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 Corer

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof_1_
Reviewer:	M
2nd reviewer:	\mathcal{C}

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

N/A

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

Concentration = $(A_x)(I_x)(V_t)(DF)(2.0)$ $(A_{is})(RRF)(V_o)(V_i)(\%S)$ Area of the characteristic ion (EICP) for the compound to be measured

Area of the characteristic ion (EICP) for the specific

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

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

Volume of extract injected in microliters (ul) =

Volume of the concentrated extract in microliters (ul)

Dilution Factor. Df =

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

Example:

Sample I.D. # 5, SS:

Conc. = $\frac{(96351)(40)(1m/)(1m)}{(1339240)(0.1946)(30.57)(0.928)(0.928)}$

= 522.5 2 520 mg/kg

2.0	= Factor of 2 to account	t for GPC cleanup	<u></u>			
#	Sample ID	Compound		Reported Concentration ()	Calculated Concentration ()	Qualification
						
			<u>,</u>			1-14
 						
					<u> </u>	
 						
						
L		<u> </u>		1	<u> </u>	·

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

Chlorinated Pesticides



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

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

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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6/02/10

Page: \(\frac{1}{\of_{\infty}}\)

Reviewer: JV 2nd Reviewer:

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

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

	Validation Area		Comments
l.	Technical holding times	Α	Sampling dates: 4 ハっハゥ
11.	GC/ECD Instrument Performance Check	A_	
III.	Initial calibration	A	r
IV.	Continuing calibration/ICV	A	ca/10 = 20 Z
V.	Blanks	A	,
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	2	Client Spec
VIII.	Laboratory control samples	Α	Chient Spec
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	Y/D	FB=1 EB = 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:

LDC #: 23252C3a

SDG #: 280-2400-2

Laboratory: Test America

Water

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

LDC #: 2325> 634 SDG #: Sec Con

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

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".

Were surrogates spiked into all samples, standards and blanks? Y N N/A

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

Qualifications	J-/41/p											The state of the s			
its)	(311-145))))	()	()	()	()	(()
%R (Limits)	53)))))))))
Surrogate Compound	∀														
Column	£,														
Sample ID	4-1/28711-082 9W														
Date															
#															

Recovery QC Limits (Water) Comments			The state of the s
Recovery QC Limits (Soil) Recovery C			
Surrogate Compound	Tetrachoro-m-xylene	Decachlorobiphenyl	
Letter Designation	A	В	

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)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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)						
Compound	SSAM2-01-1BPC**	SSAM2-01-1BPC_FD	RPD (Limits)	(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)	Α	Compound quantitation and CRQLs (RPD) (dc)
280-2771-1	SSAL3-04-1 BPC SSAL3-04-3 BPC SSAL3-04-5 BPC SSAL3-04-7 BPC SSAL3-04-9 BPC SSAM2-01-1 BPC** SSAM2-01-3 BPC SSAM2-01-5 BPC SSAM2-01-7 BPC SSAM2-01-9 BPC SSAM2-01-1 BPC_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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 6/04/n
Page: 1 of 1
Reviewer: 100
2nd Reviewer: 100

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
II.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	2 RSD 12 COV /101 & 20 %
IV.	Continuing calibration/ICV	A	ca /101 & 20 Z
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	ЙW	
Xb.	GPC Calibration	N	
XI.	Target compound identification	MΑ	
XII.	Compound quantitation and reported CRQLs	M3K	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SM	D = 6, 11
XV.	Field blanks	ND	FB = FB-04072010-R2D (280-2216-Y)

Note:

A = Acceptable

LDC #: 23252F3a

SDG #: 280-2771-1 Laboratory: Test America

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

* *	Leve / IV	د	VII							
1	SSAL3-04-1BPC			11	SSAM2-01-1BPC_FD	Þ	21	MB 280 - 12472/-A	-31 [^]	
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	**	þ	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	

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LDC #:			<u> </u>	_ `
SDG #:_	Sec	Con	re (—

VALIDATION FINDINGS CHECKLIST

	Page:_	Lof_	2
	Reviewer:	TV	6
2nd	Reviewer:		0_
		/	

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

Validation Area	Yes	No	NA	Findings/Comments
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) ≤ 20% or percent recovieries 80-120%?				
Were all the retention times within the acceptance windows?				
V Blanks	•			
Was a method blank associated with every sample in this SDG?				·
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.			<u> </u>	·
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 spika/Matrix spike duplicates	7			

LDC#: 77257 F 39 SDG#: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 11/6
2nd Reviewer: 4

· · · · · · · · · · · · · · · · · · ·				<u> </u>
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?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		<u> </u>		
IX. Regional Quality Assurance and Quality Control	/			
Were performance evaluation (PE) samples performed?			7	
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Target compound identification				
Were the retention times of reported detects within the RT windows?				
XI. Compound quantitation/CRQLs				
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	7			
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.				

LDC# 23257 F34 SDG# _ Lee Cory

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: of 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".

Were surrogates spiked into all samples, standards and blanks?

Y(N) M/A

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

Qualifications	1) mal																				Comments		
%R (Limits)	196 (63-124)		714 ()		328 (59-115)	()	0 (63-124)	1970 (59-112)	())	() 0	379 ()	()	0 ()	35% ()	((((((((((((((((((((() Q	() 0111	()	0 ()	11 10	Recovery QC Limits (Water)		
Surrogate n Compound	8	-	8	8	À		8	\ \\ \\ \\		8	A A		æ	A		6 C	Y		b .	¥	Recovery QC Limits (Soil)		
Sample ID Column	1 (20x) (col,)		5 (10x)	(x00)1) 3			7 (2604)			8 (Fix.)			.9 (5th)			(VOD) 0)			(Xeap) li		Surrogate Compound	Tetrachoro-m-xylene	Decachlorobiphenyl
# Date																					Letter Designation	A	В

LDC# 25.25 F34 SDG #: _ Spe

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

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

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

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

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 wh

er a sample extraction was performed?	fferences (RPD) within the QC limits?	
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?	

2/13 02 K	0 0		,		RPD (Limits)	Associated Samples	Cuainications	_
	2 2	- 1	RPD not	aloul	ated)	X	No such	
		7	ditutions)	()		•	
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LDC# 231/77 F34 SDG# 54 (2007)

VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: 1 of 1 Reviewer: 5VZ 2nd Reviewer: 2

METHOD: __GC__ HPLC

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

Level IV/D Only

N N/A

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

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.

#	Compound Name	Sample ID	"ARPDI"AD Between Two Columns/Detectors	Qualifications	
	a	9	193.3	3 dets/A (dc	(0)
			-		
				0	

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23252G3a SDG#:See cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:	of
Reviewer:	76
2nd Reviewer:	

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

Y N NA

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

	Conc (ug/Kg)	- RPD	Diff	Diff Limits	Quals
Compound Name	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

LDC # 22 xxx F3x SDG# 52 Cmx

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

GC EPA SW 846 Method 8081A METHOD:

4,4'-DDT Parameter:

X^2	And the second s						
√ 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						

Regression Output:	ţ		Reported	
Constant		0.00000	= 0	0.00000
Std Err of Y Est		4961.04943		
R Squared		0.99953	- 21	0.998900
No. of Observations		0.00000	Outdood in Contract	
Degrees of Freedom	11.0	5.00000		
			m1=	5850.000000
X Coefficient(s)	5928.760416	0.444903	A CONTRACTOR OF THE CONTRACTOR	
Std Err of Coef.	36.118827	0.11		

5910.36
5892.72
5582.36
0400.00

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Page: of 4
Reviewer: Mc

5571.50 5485.00

5736.12

17

LDC # 25.25 F3 (SDG# 124 Cr.

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

7 0

Page:

METHOD: GC EPA SW 846 Method 8081A

Parameter: Hexachlorobenzene

X X^2 Area Conc	39031.00 4.00	92016.00 10.00	218583.00 25.00	438324.00 50.00	653554.00 75.00	861853.00 100.00	
Compound	Hexachlorobenzene 36	6	21	43	99	98	
Column	CLP1		GCS_P2				
Date	04/26/2010						1000

8714.05 8618.53

8966.96

Ave RF

9757.75 9201.60 8743.32 8766.48

And delivery to the delivery t	A CALAGORITHM AND			
Regression Output:			Reported	
Constant		0.00000	= 0	0.00000
Std Err of Y Est		4707.31355		
R Squared		0.99979	12 =	006666'0
No. of Observations		6.00000		en e
Degrees of Freedom		2.00000		The state of the s
A CONTRACTOR OF THE CONTRACTOR			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		
Std Ell of Coel.	24.45			1

LDC # 22 27 F34 SDG# La Cres

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 2 of 4 Reviewer: 3vc 2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

eter: Hexachlorobenzene

Parameter:

≺ Conc	4.00	10.00	25.00	50.00	75.00	100.00	
× Area	58418.00	134526.00	312150.00	605013.00	879444.00	1132166.00	
Compound	Hexachlorobenzene						
Column	CLP2		GCS_P2				
Date	04/26/2010						

		A A DO WAR A CONTRACT OF THE PARTY OF THE PA		At At an
Regression Output:			Reported	
Constant		8023.22168	= 0	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		
			ı, a	NR
X Coefficient(s)	12623.434031	-13.727283	= q	NR R
Std Err of Coef.	108.349460	1.04		

13452.60	12486.00	12100.26	11725.92	11321.66	

2500.00 5625.00 10000.00

16.00 100.00 625.00

14604.50

X₂2

12615.16
ve RF

LDC # 23 25 7 F 36. SDG# 20 (2)

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

4 of 2nd Reviewer: Reviewer: Page: ___

> GC EPA SW 846 Method 8081A METHOD:

4,4'-DDT Parameter:

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

6676.75 6804.50 6852.48

Regression Output:			Reported	
Constant		-2800.24293	II O	N.
Std Err of Y Est		3336.78918		
R Squared		0.99991	12=	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			11 00	NR R
X Coefficient(s)	7098.583493	-0.256471	<u>م</u>	NR
Std Err of Coef.	159.475846	1.53		

7010.73 7050.06

7110.22

Ave RF

6917.46

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DC # 23	77 #50
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VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

] o	ME	
Page:	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:

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

Where: 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	0 %	Q%
#	Standard ID	Date	Compound					
1	005F0501	Ĺ	Hexachlorobenzene CLP1	50	51.20	51.73	2.4	3.5
			4,4'-DDT CLP1	20	46.80	46.54	6.4	6.9
			Hexachlorobenzene CLP2	50	50.40	50.37	0.7	2.0
			4,4'-DDT CLP2	50	51.10	51.13	2.3	2.3
2								

	Compound		Area	ď	q	υ
SCVI	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 #:	23	25	?	F	34
SDG #:	S	· e	Co	·	/

VALIDATION FINDINGS WORKSHEET <u>Surrogate Results Verification</u>

Page:	_lofl
Reviewer:	006
2nd reviewer	

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

~	percent recoveries ((O/ D)								
i na	narcant racovarias i	% ₩	I OT CHITTOC	DIDC WOLD	recoloulated to	ar tha com	mounde identified	bolow unions the	s tallaurina	aniouintion:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: # 6

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 78	328	0
Decachlorobiphenyl	1 1		0	0	0	
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						

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#: 23251 F34 SDG # 74 (27)

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

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:

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

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

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

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples:_

12/3

	ď	ike	Sample	Spiked	Spiked Sample	Matrix	Matrix Spike	Matrix Spik	Matrix Spike Duplicate	ž	MS/MSD
Compound	& %	Added (vg /g_)	Concentration	Conce	ntration)	Percent	Percent Recovery	Percent F	Percent Recovery		RPD
	MS	U MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	18.7	78.8	0 .	. 37	26	No	139	Š	84)	Ž	0
4,4'-DDT	` \		580	515	165	25 -	0	27	25	u	Ŵ
Arocior 1260											

Comments: Refer of 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.

SDG #: _ See Control Sample/Laboratory Control Sample Duplicate Results Verification VALIDATION FINDINGS WORKSHEET LDC#: 23257 F3

Page: lof

Reviewer: 2nd Reviewer:_

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

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

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

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

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

165 280- 12472 LCS/LCSD samples:_

	Spi	Ke	Spiked	Sample	רכ	SOT	GSOT	gs	/SOT	TCS/TCSD
Compound	Adc (Vg)	Added (Vg/kg)	Conce (125	Concentration (1/5 / (c.)	Percent F	Percent Recovery	Percent Recovery	Recovery		RPD
	SOT	C LCSD	SOT	GSOT 0	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.1	₹V	14.0	₹¢X	87	43				
4,4'-DDT		_	2741		-	1.4				
Aroclor 1260										

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

LDC #:	25	+3c
SDG #:	See C	~

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:	W6
2nd reviewer:	J

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

$\langle Y \rangle$	N	N/A
(V	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.
$$\frac{4}{6}$$
 $\frac{4}{4}$: bbT

Conc. = $\frac{360293}{5850}$ (10ml) (10m)

(5850) (30.89) (0.899)

= 18538.9
 $\frac{19000}{2}$ ug/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:

Soil

Parameters:

Chlorinated Pesticides

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

SSAM3-02-9BPCMS

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)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

	Concentral	tion (ug/Kg)	DDD	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

	Date:	6/64/10
	Page:_	<u>\</u> of/
ŀ	Reviewer:	JV6
2nd I	Reviewer:	0
		7

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 /23 //o
П.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	2 RSD YY COV/101 £ 20 }
IV.	Continuing calibration/ICV	A	car/10/ £ 20 }
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SN)	
VIII.	Laboratory control samples	A	us
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	Α	
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 ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate TB ≃ Trip blank

EB = Equipment blank

Validated Samples:

LDC #: 23252G3a

SDG #: 280-2836-1 Laboratory: Test America

Soil

	201				 	
1	SSAM3-02-1BPC b	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 D	16		26	36	
7	SSAM3-02-7BPCMS	17		27	37	
8	SSAM3-02-7BPCMSD	18		28	38	
9	SSAM3-02-9BPCMS	19		29	39	
10	SSAM3-02-9BPCMSD	20		30	40	

LDC#: 73252 634 SDG #: 200

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: | of | 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".

Were surrogates spiked into all samples, standards and blanks?

Y(N)N/A

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

Qualifications	No gral	,																	
%R (Limits)	(63-124)		()	() 0	() 2012	()	() 0	(930 (()	() 0	() 2>>1		0	() 9725	() 0	7270 ()	()	()	
Surrogate Compound	B	.∢		\$	Ą	•	~	74		8	*	-	B	_\ \	В	Ą	-		
Column	C4.145																-		
Sample ID	(×000 S)	\ 		2 (2010×)			(x 0005) E			4 (500x)	\ \		(X0001) 5		(×000≤) g				
Date																			
#																			

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachoro-m-xylene			
В	Decachlorobiphenyl			

LDC # 29254 694 SDG #: See Corry

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". X N N/A

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

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

Shak Qualifications Associated Samples RPD (Limits) ar lated ditutions MSD %R (Limits) root A D D 7 MS %R (Limits) duc Compound I X 9 CO I MS/MSD ID FOOK) 20 Date

LDC#: 23252G3a SDG#:See cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:	<u> </u>
Reviewer:	No
2nd Reviewer:	

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)
YN NA Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Qual s (Parent Only)	
Compound Name	1	6	(≤50%)	Dill	J.II. Z.III.		
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

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 4, 2010

Matrix:

Soil

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 (r²) was greater than or equal to 0.990.

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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)	A

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)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada 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)	А	Surrogate spikes (%R) (s)
280-2879-1	SSAI3-04-1BPC** SSAI3-04-3BPC SSAI3-04-5BPC SSAI3-04-7BPC SSAI3-04-9BPC	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

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

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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B /4

	Date:	6/02/10
	Page:_	<u>lof_/</u>
	Reviewer:	NG
2nd	Reviewer:	
		\mathcal{F}

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: f/26 /ro
II.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	2 RSD r
iV.	Continuing calibration/ICV	A	ca/10 = 20 ?
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	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	SHIND	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

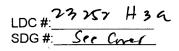
EB = Equipment blank

Validated Samples:

LDC #: 23252H3a

SDG #: 280-2879-1 Laboratory: Test America

* 	cerc/ /V	011				
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.	
88		18		28	38	
9		19		29	39	
10		20		30	40	



VALIDATION FINDINGS CHECKLIST

Page: __lof_2 Reviewer: ______2 2nd Reviewer: _______

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

Validation Area	Yes	No	NA	Findings/Comments
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	ı			
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) ≤ 20% or percent recovieries 80-120%?				
Were all the retention times within the acceptance windows?				
V Blanks	<u>.</u>			
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?	٠	/		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				

LDC#: 2322 H39 SDG#: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 11/6
2nd Reviewer: _____

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?				
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	1			
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			_	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?				
XI. Compound quantitation/CRQLs	•			
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

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

A alpha-8HC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	96.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Arocior-1248	Ŧ
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	=
D. gamma-BHC	L. Endosulfan II	T. garmma-Chlordane	BB. Aroclor-1260	,17,
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	Ř.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	П П
G. Heptachlor epoxide	o. 4,4'-DDT	W. Aroclor-1221	EE. Hexachlorobenzen	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	Ë	NN.

COMPLST-3S.wpd

Notes:_

LDC#: 23257 H34 E Z SDG #:

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: 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".

Were surrogates spiked into all samples, standards and blanks?

YNMA

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

Qualifications	J+ dets/A (S)																			
%R (Limits)	15 (63-124)	196 (1)))	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	
Surrogate mn Compound																				
Column																				
Sample ID	(x5) 1	> ノ																		
Date																				
#																				

Comments			
Recovery QC Limits (Water)			
Recovery QC Limits (Soil)			
Surrogate Compound	Tetrachoro-m-xylene	Decachlorobiphenyl	
Letter Designation	A	В	

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SDG #:

Page: 1 of 1 Reviewer: 106

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

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

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

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

Date	al as/msm	Compound	N %R (I	MS %R (Limits)	MS %R (L	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	6 /7	34	- 15	(56-130)	512-	(041-85))		No mal.
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Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 4
Reviewer: 106 Reviewer: 2Nd 2nd Reviewer:

> GC EPA SW 846 Method 8081A METHOD:

Hexachlorobenzene Parameter:

olumn Compound CLP1 Hexachlorobenzene CS_P2	X Y X^2 Area Conc	39031.00 4.00	92016.00 10.00	218583.00 25.00	438324.00 50.00	653554.00 75.00	861853.00 100.00	
I O I Č	Column	CLP1 Hexachlor		GCS_P2		•		

8714.05 8618.53

9757.75 9201.60 8743.32 8766.48 8966.96

Ave RF

Regression Output:			Reported	
Constant		0.00000	II 0	000000
Std Err of Y Est		4707.31355		
R Squared		0.99979	r2 =	006666.0
No. of Observations		00000'9		
Degrees of Freedom	The state of the s	5.00000		4.5
TOTAL CONTROL OF THE PARTY OF T			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		

LDC # 222 25 x #24 SDG# 54 Cm

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

4 0 4

Page:

Reviewer: TVC 2nd Reviewer: A

METHOD:

GC EPA SW 846 Method 8081A

4,4'-DDT Parameter:

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

Regression Output:	- A Prince of the Control of the Con		Reported	
Constant		-2800.24293	= 0	NR
Std Err of Y Est		3336.78918		
R Squared		0.99991	12 =	0.999900
No. of Observations		6.00000		100 AND 100 AN
Degrees of Freedom		3.00000		
over constitution of the c			11	NR
X Coefficient(s)	7098.583493	-0.256471	= q	NR
Std Err of Coef.	159.475846	1.53		

7050.06 6804.50 6852.48 7010.73 7110.22

6676.75

6917.46 Ave RF

23 254 Had SDG# LDC #

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2 of 4
Reviewer: 306
2nd Reviewer: 2

GC EPA SW 846 Method 8081A METHOD:

Hexachlorobenzene Parameter:

X^2	A CANADA AND A CAN				- at MARTINE		
≺ 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						
Column	CLP1		GCS_P2				
Date	04/26/2010						

Regression Output:	H.		Reported	
Constant		0.00000	= 0	0.00000
Std Err of Y Est		4707.31355		A COLOR OF THE COL
R Squared		0.99979	r2 =	0.999900
No. of Observations		0000009		
Degrees of Freedom		5.00000		
The state of the s			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		

8714.05 9757.75 9201.60 8766.48 8618.53 8743.32

Ave RF

8966.96

LDC # 23 25 x H34 SDG# 52 Cm SDG# SDG

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 4 of 4

GC EPA SW 846 Method 8081A METHOD:

Hexachlorobenzene Parameter:

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	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	= 3	NR
Std Err of Y Est		2267.04743		
R Squared		0.99998	r2 =	1.000000
No. of Observations		00000'9		
Degrees of Freedom		3.00000		
			ii O	NR
X Coefficient(s)	12623.434031	-13.727283	= q	NR
Std Err of Coef.	108.349460	1.04		

13452.60	12486.00	12100.26	11725.92	11321.66	

14604.50

12615.16 Ave RF

SDG# 54 CMY

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: Of Deviewer: Alpha

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

Where:

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

					7	المهمانيماميم	Donottod	Potelioleog
					Keported	Kecalculated	Reported	Recalculated
		Calibration		CCV Conc	Conc	Conc	O %	%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								

_	Compound		Area	Ø	þ	U
÷	CCV1 Hexachlorobenzene CLP1	CLP1	425898		8633.00	
<u></u>	4,4'-DDT	CLP1	291851		5850.00	
=	Hexachlorobenzene CLP2	CLP2	598465	-13.727283	12623.43	8023.22
- 1	4,4'-DDT	CLP2	370673	-0.256471	7098.58	-2800.24293
<u> </u>						

LDC #: 33267 H34 SDG #: Su Corr

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

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Reviewer:		N/c
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		7

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

Tt	-i (0/ D	N = £ =		. 44		to a tar the state of the state		
The percent recove	ries (%R	J of suffociates we	ere recalculated tol	ine comp	ounas identifiea	pelow usinc	i the following	i calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	CLPI	4.0	3.72345	13	13	0
Decachlorobiphenyl	1		7.80862	195	195	
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						

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:			

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification LDC# 23 25x Haa SDG #: 20 Cre/

VALIDATION FINDINGS WORKSHEET

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 laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

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

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

280- 13039 S LCS/LCSD samples:

								·		
TCS/TCSD	RPD	Recalc.	\							
SOT	œ	Reported								
CSD	Recovery	Recalc.								
רכ	Percent Recovery	Reported								
S	ecovery	Recalc.	43	48						
SOT	Percent Recovery	Reported	93	86						
Sample	itration	GSJ 0	₩	7						
Spiked	Concentration (VS / L)	SOT	١٤٠٨	71						
oike.	Added (49 /k.)	GSDI 0	A.	→						
5	A V	รวา	16.3	~						
	Compound		gamma-BHC	4,4'-DDT	Aroclor 1260					

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

LDC #:	23252 H3A
SDG #:	Sulm

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof
Reviewer:	
2nd reviewer:	(
	1

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

1	Y	N	N/A
	7/	N	N/A
. '	7	$\overline{}$	

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?

Hexa chlors burene
(10 ml) (5)
(10 ml) (5) (31.8g) (0.925)

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

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)	А	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

Date:	יכס
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Reviewer:	a
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280-2216-9 SDG #: Laboratory: Test America

23252A4

LDC #:

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: 417110
II.	ICP/MS Tune	A	
III.	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	1
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Norvilled
XI.	ICP Serial Dilution	V	Not preserved
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
XV	Field Blanks	NO	FB= FB = 01072010- 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	SA137-9BPC	11	RBW	21	31	
2		12		22	32	
3		13		23	33	
4		14		24	34	
4 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)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23252B4 Stage 2B SDG #: 280-2301-8 Laboratory: Test America

Reviewer: C 2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
l.	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	Ν	Clientspecified
VII.	Duplicate Sample Analysis	N	<u></u>
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Norvilized
XI.	ICP Serial Dilution	N	Non prefined
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\wedge	
ΧV	Field Blanks	NO	F3=FB-0407@2010-RZC

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

(280-2280-2) D = Duplicate

TB = Trip blank

FB = Field 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

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	Analyte	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)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

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)	А	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	Α	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

Stage 2B

Date:	6-2-1
Page:_	of I
Reviewer:	
2nd Reviewer:	W

METHOD: Metals (EPA SW 846 Method 6020)

LDC #: 23252C4

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

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

		7.7	
L	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/13/10
11.	ICP/MS Tune	A	•
III.	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	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not usinged
XI.	ICP Serial Dilution	N	Not preserved
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$ \sim $	
ΧV	Field Blanks	SW	FB=1, EB=Z Cno 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:

	Water						
1	FB-04132010-RIG2-RZE	11	8BW	21		31	
2	EB-04132010-RIG3-RZD	12		22	And the state of t	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 #: 23252C4 SDG #: SEO COPO?

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer: 4

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
12		Al, Sb, As, Ba, Be, Cd, Ca, Cr (Co) Cu, Fe, Pb, (Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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,
		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',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni. K. Se. Ag. Na. Tl. V. Zn. Mo. B. Si. CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, 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		AI, Sb(As) Ba, Be, Cd, Ca, Cr, Co)Cu, Fe(Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
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

LDC #: 23252C4 SDG #: See Cover METHOD: Trace me Sample Concentratic	LDC #: <u>23252C4</u> SDG #: <u>See Cover</u> METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: <u>ug/L</u>	(EPA SW 86	34 Method 60 therwise not)10B/6020/7. ed: <u>ug/L</u>	> Ø 4	VALIDATION FINDINGS WORKSHEE PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA Associated Samples: All	DATION FINDINGS WORKSHEET ICB/CCB QUALIFIED SAMPLES reparation factor applied: NA ciated Samples: All	Reason Code: bl	2nd	Page: of) Reviewer: QCC 2nd Reviewer: (ACC)
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a ICB/CCB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	2					
လ			0.0139		0.012 / 1.0					

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

LDC #: 23252C4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of 2nd Reviewer: Reviewer: C2

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

Were field blanks identified in this SDG?

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

Sampling date: 4/13/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other. Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/13/10 Soil factor applied 10

Field Blank: (be)

Associated Samples: No Associated Samples

	- T	T	Ī	Ī					- 1	Ī	Ī			Ī	Ī	I	Ī		Ī	
		-		-																
]								
Action Level																				
2	0.012	0.98	5.3																	
	Q	Ju	Λg																	
	2	2 Action Level 0.012	2 Action Level 0.012 0.98	2 Action 0.012 0.98 5.3	2 Action Level 0.012 0.98 5.3	2 Action 0.012 0.98 5.3	2 Action Level 0.012 0.98 5.3	2 Action Level 0.012 0.98 5.3	2 Action 0.012 0.98 5.3	2 Action 0.012 0.098 5.3	2 Action 0.012 0.98 5.3 5.3	2 Action Level 0.012 0.98 5.3 5.3	2 Action Level 0.012 0.098 5.3 5.3	2 Action Level 0.012 0.98 5.3 5.3	2 Action Level 0.012 0.98 5.3 6.3	2 Action Level 0.012 0.98 5.3 6.3	2 Action Level 0.012 0.98 5.3 6.3	2 Action Level 0.012 0.08 5.3 5.3	2 Action 0.012 0.98 5.3 5.3	2 Action 1.0.012 0.012 0.98 5.3 5.3

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

June 7, 2010

Matrix:

Soil

Parameters:

Arsenic & Manganese

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

Tronox Northgate Henderson N COMPLETENESS WORKSHEET

_DC #:	23252D4	_ VALIDATION COMPLETENES
SDG #:	280-2400-9	Stage 2B
_aborator	y: Test America	<u> </u>

Date: 6-3-10
Page: cof 1
Reviewer: _ cc
2nd Reviewer:

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 4/13/10
11.	ICP/MS Tune	B	
Ш.	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	
VIII.	Laboratory Control Samples (LCS)	A	Ľ ち
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	Morublized
XI.	ICP Serial Dilution	N	Notpermed
XII.	Sample Result Verification	N	,
XIII.	Overall Assessment of Data	P	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-04072010-RZC, FB-04132010-RIGZ-RZE (250-2280-2) (280-2480-2)

N = Not provided/applicable

SW = See worksheet

R = Rinsate

FB = Field blank

TB = Trip blank

EB = Equipment blank

Validated Samples:

1	SSAO3-01-2BPC	11	185	21	31	
2	SA139-4BPC	12		22	32	
3	SSAO8-01-10BPC	13		23	33	
4	SA128-6BPC	14		24	34	/
		15		25	35	
5 6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		

LDC #: 2325204 SDG #: 580 CarOZ

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer: 1

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2,4		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,
3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg(Mn)Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		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,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb(As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

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

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) LDC #: 23252D4 SDG #: See Cover

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

Reason Code: bl

Page: of
Reviewer: OAE
2nd Reviewer:

3		
Associated Samples:		
Associate	တ	
	No Qualifier	
ted: ug/L	Action Limit	
otherwise no	Maximum ICB/CCB ^a (ug/L)	0.974
its, unless o	Maximum PB ^a (ug/L)	
centration ur	Analyte Maximum Maximum PB ^a ICB/CCB ^a (ug/L) (ug/L)	
Sample Concentration units, unless otherwise noted: ug/L	Analyte	Mn

a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note: S90%

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)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

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)	А	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

Tronox Northgate Henderson WORKSHEET

LDC #:	23252E4	_ VALIDATION COMPLETENESS \
SDG #:	280-2448-13	Stage 2B
Laborator	ry: Test America	

Date: <u>6-3-16</u>
Page: ر of
Reviewer:
2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments				
I.	Technical holding times	A	Sampling dates: 4/14/10				
11.	ICP/MS Tune	A					
111.	Calibration	A					
IV.	Blanks	A					
V.	ICP Interference Check Sample (ICS) Analysis	A					
VI.	Matrix Spike Analysis	AN	client specified				
VII.	Duplicate Sample Analysis	N					
VIII.	Laboratory Control Samples (LCS)	A	LLS				
lX.	Internal Standard (ICP-MS)	A					
X.	Furnace Atomic Absorption QC	\mathcal{N}	Not desired				
XI.	ICP Serial Dilution	N	Not preformed				
XII.	Sample Result Verification	N					
XIII.	Overall Assessment of Data	A					
XIV.	Field Duplicates	\checkmark					
ΧV	Field Blanks	NO	FB=FB-04072010-RZC,FB-04132010-RIGZ-RZE (280-2280-2) (280-2480-2)				
	(280-2280-2) (280-2480-2)						

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (**250-2250-2)** ed D = Duplicate TB = Trip blank

EB = Equipment blank

*see below

Validated Samples:

	<u> </u>					
1	SA17-9BPC	11	PB5	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	
9		19		29	39	
10		20		30	40	

Notes:	*	EB= EB-04142010-RIGI-RZC	(280-2448-2)	
		= EB-04142010-RIGA-RZC	<u> </u>	

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

SSA07-02-1BPC

SSA07-02-5BPC

SSAM2-01-1BPC**

SSAM2-01-5BPC

SSAM2-01-1BPC FD

SSAM2-01-5BPCMS

SSAM2-01-5BPCMSD

^{**}Indicates sample underwent Stage 4 review

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	Cobalt	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	Analyte	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)	А

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

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

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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)	А

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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:_ Stage 2B SDG #:__ 280-2771-1 Laboratory: Test America

Reviewer: C 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: 4/22/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	Sin	MS/D ·
VII.	Duplicate Sample Analysis	\ <u>\</u>	
VIII.	Laboratory Control Samples (LCS)	A	US
IX.	Internal Standard (ICP-MS)	P -	
Χ.	Furnace Atomic Absorption QC	W	No+ULI lized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not riched for 2B
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(25,7)
XV	Field Blanks	SW	FB= FB-04/32010-RIGZ-RZE, FB-04072010-RZC (280-2405-2) (280-2280-2)
	ND A		(280-2400-2) (280-2280-2)

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(280-2405-2) D = Duplicate TB = Trip blank

EB = Equipment blank

X* Level 4 Validated Samples:

	30.1					
1	SSAN7-03-1BPC	11	805	21	31	
2	SSAN7-03-5BPC	12		22	32	
3	SSAO7-02-1BPC	13		23	33	
4	SSAO7-02-5BPC	14		24	34	
5	SSAM2-01-1BPC**	15		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	

Notes:	

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7 Reviewer: 4 2nd Reviewer: 1

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

Validation Area	V			Fig. 11 12
Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.		F		
Cooler temperature criteria was met.		<u> </u>		
III: Califications as well 22				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution < 5%?		<u> </u>		
Were all instruments calibrated daily, each set-up time?	/			
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?				
III. Blands				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.			1) 2)	
IV ICP file representation Checke Sample of the Committee				14404-
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			201200000	
IV. watoxspike/Matrixespike/dubilcates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		\		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	₩	₹ /		
V Laboratory controls ampres 4				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

LDC#: 23752P1 SDG#: SECOVER

VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: 2

Validation Asso	Var	Na	NA.	Findings/Comments
Validation Area	Yes	No No	NA	Findings/Comments
If MSA was performed, was the correlation coefficients > 0.995?				
Do all applicable analysies have duplicate injections? (Level IV only)			_	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)				
Were analytical spike recoveries within the 85-115% OC limits?				Control of the Contro
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.				
Villatheng Santares (er a swassadether/ab/ab/ab/ab/ab/ab/ab/ab/ab/ab/ab/ab/ab/		n.		
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?				
2. Bioglobal CharlineAstricanos anexiqualifiyasion(rolus)				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				Î
X Sample Resturaved (Cation)				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Overall assessment of delanation				
Overall assessment of data was found to be acceptable.				
XIMEGIO insuceres				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XIII: Figire prantis e se e e e e e e e e e e e e e e e e e				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

LDC #: 23252F1 SDG #: SECCOPOL

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		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,
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, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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, Tl, V, Zn, Mo, B, Si, CN',
		Al. Sb. As. Ba, Be, Cd. Ca, Cr. Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, 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, 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, (s) Ba, Be, Cd, Ca, Cr, (co) Cu, Fe, (c), Mg, (di), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed

LDC #: <u>23252F4</u> SDG #: See Cover	VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES	Page:
METHOD : Trace metals (EPA SW 864 Method 6010B/6020/7000)	Soil preparation factor applied: 100x	Reason Code: bl 2n
Sample Concentration units, unless otherwise noted: mg/Kg	Associated Samples: 1-4	

No Qualifiers

Action Limit

Maximum ICB/CCB^a (ug/L)

Maximum PB^a (ug/L)

Maximum PB³ (mg/Kg)

Analyte

0.0462

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Note:

LDC #: 2312604 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: \[\text{of} \]
Reviewer: \(\frac{\zeta_{\sqrt{\sqrt{\cein}}}}{\zeta_{\sqrt{\cein}}} \]

2nd Reviewer:

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

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

Were target analytes detected in the field blanks?

Field Blank: (bf)

ケー

Associated Samples:

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/8/10 Soil factor applied

Sampling date: 4/8/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other:

Sample Identification Action Level FB-04072010-RZC (SDG#: 280-2280-2) Blank ID 0.016 Analyte ပိ

100 # 23252 FY spg # 360 00 PL

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Lof Reviewer:_ 2nd Reviewer._

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

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

N N/A

Was a matrix spike analyzed for each matrix in this SDG? N/A N/A

Were matrix spike percent recoveries (%R) within the control limits of $\hbar 5-125$?) If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

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

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

as Qualifications	5/05/A (m)	No Qual (LCS in)	,										
Associated Samples	5-7)										
RPD (Limits)		27	724										
MSD %Recovery	113												
MS %Recovery	72												
Analyte	GD GD	Pb	LY LY										
Matrix	So;												
MS/MSD ID	8/9	•											

Comments:

LDC#:_	23252	2F4
SDG#:	See C	over

VALIDATION FINDINGS WORKSHEET Field Duplicates

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Page:	_of
Reviewer:_	(C
2nd Reviewer:_	م

METHOD: Metals (EPA Method 6020/7000)

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

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

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

100 #. 23259 FY

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: GZ

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

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

%R = Found × 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICO	ICP/MS (Initial calibration)	£3	41.5	0h	1001	HOI	<u>}</u>
73	ICP/MS (Continuing calibation)	(A)	52.1	20	101	103	5

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

SDG # SER COLON LDC#_23282F

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Reviewer: Page:

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

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

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

True = Concentration of each analyte in the source.

%R = Found x 100

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

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

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

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

%D = I-SDR × 100

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

				•			
					Recelculated	Reported	
Sample ID	Type of Analysis	Element	Found 18/1 F	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
JCS AB	ICP interference check	Mn	Jer 201	18001	701	7201)-
531	Laboratory control sample	90	402	0.02	701	701	
8	Matrix spike	As	(ssr-sr) 19,5	L'02	}	hb	
<i>b18</i>	Duplicate	WN	927	gh&	2h	25	
2	ICP serial dilution	GD)	129	G. 3	3.7	3.5	>

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.

VALIDATION FINDINGS WORKSHEET **Sample Calculation Verification**

Reviewer: 2nd reviewer:

Please see qualification N N/A Have Y N N/A Are re	als (EPA SW 846 Method 6010/7000) ons below for all questions answered "N' results been reported and calculated co esults within the calibrated range of the i	orrecuv?		
Detected analyte resu following equation:	Its for	15	were recalculated and	d verified using the
Concentration = (RD)(F (In. Vo		ulation:		
FV = Final vo n. Vol. = Initial vo Dil = Dilution	ta concentration slume (ml) olume (ml) or weight (G) factor I percent solids	(10mL)(5)(6)(6)	6.45/28/4) = .	3.2 melt8
Sample ID	Analyte	Reported Concentration (~~~/ C	Calculated Concentration	Acceptable (Y/N)
5	AS	3.2	3.2	7
	mn	390	390	Ì
	67	270	210	
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 23, 2010

LDC Report Date:

June 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

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)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

	Concentra	tion (mg/Kg)		B		
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)	А
Manganese	160	370	79 (≤50)	•	J (all detects)	Α
Lead	1300	660	65 (≤50)	-	J (all detects)	Α

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)	А	Sample result verification (PQL) (sp)
280-2836-1	SSAM3-02-1BPC SSAM3-02-1BPC_FD	Arsenic	J (all detects)	А	Field duplicates (Difference) (fd)
280-2836-1	SSAM3-02-1BPC SSAM3-02-1BPC_FD	Manganese Lead	J (all detects) J (all detects)	А	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 WORKSHEET

LDC #:_	23252G4	VALIDATION COMPLETENESS
SDG #:_	280-2836-1	Stage 2B
Laborato	ory: Test America	-

Date:6-3-10 Page: _ of) Reviewer: 2nd Reviewer: V

METHOD: Metals (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/23/10
11.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms/p
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	us
iX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Noweilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	PS	
XIV.	Field Duplicates	SW	(0,5)
ΧV	Field Blanks	NO	FB-FB-0413Z010-RIGZ-RZE, FB-04012010-RZC (280-2400-2) (280-2216-2)
	A - Assestable ND - N		(280-2216-Z)

Note:

A = Acceptable

N = Not provided/applicable

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SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

,	50.1					
1	SSAM3-02-1BPC	11	RBS	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:		

LDC#<u>237</u>5264 SDG#<u>SECOVE</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_	of1_
Reviewer:	(R
2nd reviewer:	<u> </u>

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2,5		Al, Sb,(Âs), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe,(Pb) Mg,(Mn)Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
34		Al, Sb(As,)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
7 7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
QC6,1		Al, Sb, 🙉 Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, 🖒 Mg, (Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
	Ti di	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: M	Mercury by CVAA if performed	

Page: Or 2nd Reviewer:_ Reviewer: Reason Code: bl VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: 1, 2, 5

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Callipics.			
Associated Gallipies.			
	No Qualifiers		
Olca, adia	Action		
S S S M S S S	Maximum ICB/CCB ^a (ug/L)		
1110, GIIICO	Maximum Maximum Maximum PBª ICB/CCBª (mg/Kg) (ug/L) (ug/L)		
cample concernation and; amess calcinise notes, and a 101mg		0.0442	0.144
	Analyte	Pb	Mn

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

LDC#:	23252G4
SDG#:	See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	of
Reviewer:	a
2nd Reviewer:_	

METHOD: Metals (EPA Method 6020/7000)

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

	Concentration	Concentration (mg/Kg)		(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

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)	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

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

Tronox Northgate Henderson RKSHEET

LDC #: 23252H4	VALIDATION COMPLETENESS WOR
SDG #: 280-2879-1	Stage 2B / U
Laboratory: Test America	, (

Date:	<u>6-3</u>	_10
Page:_	lof_	1
Reviewer:	Q2_	-
2nd Reviewer:	<u> </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
1.	Technical holding times	A	Sampling dates: 4/26/10
Н.	ICP/MS Tune	A	
Ш.	Calibration	Ä	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	mS/D
VII.	Duplicate Sample Analysis	\mathcal{N}	•
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Notutitized
XI.	ICP Serial Dilution	7	
XII.	Sample Result Verification	A	Norreviewed for 2B
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$ \mathcal{N} $	
XV	Field Blanks	NO	R= FB04062010-RZB, FB-04072010-RZD (280-2131-1) (280-2216-2)

NI	\sim	te	٠.	
ıν	u	ıc	Z.	

A = Acceptable

N = Not provided/applicable SW = See worksheet

R = Rinsate

FB = Field blank ** Levely

TB = Trip blank

EB = Equipment blank

Validated Samples: 50\\

1	SSAJ2-02-1BPC	11	PBS	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		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

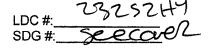
Notes:			

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7
Reviewer: CR
2nd Reviewer: _____

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

Validation Area	Yes	No	NA	Findings/Comments
######################################	165	140	IVA	Findings/continents
All technical holding times were met.				
Cooler temperature criteria was met.	7			
He Calibration is a series of the series of			4	Company of the second
Were all isotopes in the tuning solution mass resolution within 0.1 amu?		,		
Were %RSD of isotopes in the tuning solution < 5%?				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?				
Were all initial calibration correlation coefficients ≥ 0.995?				
III Brade				
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.				
IX-ligit intellerence eneck samples en				LAND COLUMN
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV. Matrix spike/Matrix spike/dupi/cates				No.
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				·
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.				
V. Laboratory control samples is:				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: CZ 2nd Reviewer:

Validation Asso	Yes	No	NA	Findings/Comments
Validation Area Vi-Tennase/AlegaryAssignensus	162	140		1 manager somments
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? VII-102 Sec. (2016)				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	<u> </u>			
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
VIII shrendi. Sebianca (Sees)98886 (Jenes) (Se20) (123)				
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?				
DX: Regional Quanty 22 studies and Quality 2 servels 4				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits? X. Sampler results/entireation				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Overall assessmento dele 222 12				
Overall assessment of data was found to be acceptable.				
XIIv Field Minute alegans				
Field duplicate pairs were identified in this SDG.		_		
Target analytes were detected in the field duplicates.				
XII BEIGH BEING BE				
Field blanks were identified in this SDG.	V			
Target analytes were detected in the field blanks.				

LDC #: 235/2H4 SDG #: SEECOVER

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of Beviewer: Color Sand Reviewer:

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

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

%R = <u>Found</u> x 100 Wher True

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

					Recalculated	Reported	,
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)	-					
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	PS	5,0h	(7 O h	101	101	}
3	ICP/MS (Continuing calibation)	Ps	50,3	S,	101	101	5-

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

100# 23752HY SDG#56660

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:

%R = Found x 100 True

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

True = Concentration of each analyte in the source.

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

RPD = <u>IS-DI</u> × 100 (S+D)/2

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

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

%D = II-SDR × 100

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found/S/1 S	True / D / SDR (unite)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
ICSAB	ICP interference check	£	IOLAGIL	worth	(O-(14-1) -
<i>\$</i> 37	Laboratory centrol sample		26)	20.02	47	26	
S	Matrix spike		(ssr-sr) 19,9	212	トも	hb	
5/6	Duplicate		9'52	3.25	7	þ	
	(CP serial dilution	\rightarrow	2'3	5,93	٩	3.5	\rightarrow

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

8017.

LDC #: 23252HY SDG #: Secores

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u>or</u>
Reviewer:_	Ce
2nd reviewer:_	

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

			0 (E) A 011 0+C	ivied iod 6010/7000)			
Please Y N Y N Y N	N/A	Are res	sults within the	questions answered "N". orted and calculated con calibrated range of the in below the CRDL?	rrecuy?		
Detect followi	ted analyte	e result on:	s for	· F	-)5	were recalculated and	l verified using the
Concen	tration =	(RD)(FV (In. Vol.)		Recalcu	lation:		
RD FV In. Vol. Dil %S	=	Final volu initial vol Dilution f	a concentration ume (ml) ume (ml) or weight actor percent solids		(0.92) (10.03)		uslkg
	Sample ID		·	Analyte	Reported Concontration (mg (%)	Calculated Concentration (MS CS)	Acceptable (Y/N)
	7			04	11.0	11.0	. 7

		Reported	Calculated	
Sample ID	Analyte	Reported Concentration (158)	Calculated Concentration (NS/ICS)	Acceptable (Y/N)
7	AS	4,9	4.9	Ÿ
<u> </u>				
	. 1		•	

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	Flag	A or P
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 SSAK8-04-5BPC SSAK8-05-1BPC 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 ET

LDC #: 2	3252J4	VALIDATION COMPLETENESS WORKSHE
SDG #: 2	280-2960-1	Stage 2B
I aboratory: T	Test America	· ·

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/27110
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	2	
VIII.	Laboratory Control Samples (LCS)	4	us
IX.	Internal Standard (ICP-MS)	a	
X.	Furnace Atomic Absorption QC	\searrow	Notucinzed
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	4	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	MD	FB=FB04062010-RZB, FB-04072010-RZD

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

(280-2131-1)

(280-2216-2)

D = Duplicate TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

,	······································						
1	SSAR7-02-1BPC	11	SSAR7-02-1BPCMS	21	895	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		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)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

Concentration (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

Tronox Northqate Henderson

LDC #: 23252L4	VALIDATION COMPLETENESS WORKSHEET
LDC #	•
SDG #: 280-3059-1	_ Stage 2B / U
Laboratory: Test America	_

Page: __of_\ Reviewer: 02 2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	9	Sampling dates: 4/29/10
II	ICP/MS Tune	A	
1.	Calibration	A	
1.	Blanks	A	
<i>'</i> .	ICP Interference Check Sample (ICS) Analysis	B	
l	Matrix Spike Analysis	A	ms/D
11.	Duplicate Sample Analysis	N	
11	Laboratory Control Samples (LCS)	A	LCS
ζ.	Internal Standard (ICP-MS)	A	
, 	Furnace Atomic Absorption QC	N	Notutinged
1.	ICP Serial Dilution	A	
11.	Sample Result Verification	A	Not reviewed for level & 2B
11.	Overall Assessment of Data	A	
V.	Field Duplicates	SW	(4,5)** (3,5)
V	Field Blanks	NO	FB=FB04062010-RZB, FB-04072010-RZC (280-2131-1) (280-2280-2)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected D = Duplicate

TB = Trip blank

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples: ** Level 4

	<u>⊃</u> 6.\				
1	SSAQ4-04-1BPC	11	8002	21	31
2	SSAQ4-04-5BPC	12		22	32
3	SSA04-05-1BPC **	13		23	33
4	SSAO4-05-5BPC	14		24	34
5	SSAO4-05-1BPC_FD	15		25	35
6	SSAQ4-04-1BPCMS	16		26	36
7	SSAQ4-04-1BPCMSD	17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:		

LDC# 23252LY SDG#: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7
Reviewer: 4
2nd Reviewer: 1

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

Validation Area	Yes	No	NA	Findings/Comments
1. Dechargal molding rumgises 1.3%			1 11/2	1 Triange Voluments
All technical holding times were met.				
Cooler temperature criteria was met.				·
Bacaubreuting a commission of the commission of				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution < 5%?				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?		· · · · · ·		
Were all initial calibration correlation coefficients ≥ 0.995?		55.5000000000		
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV-kSP Intercence Check/Samples - 199	7.4			
Were ICP interference check samples performed daily?		_		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		2.5500000000000000000000000000000000000		
IV: Mathx:spike/Mathx:spike/dublicates				
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.	/	1		·
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.		Ŷ		
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 as				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



VALIDATION FINDINGS CHECKLIST

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

Volidation Area	Yes	No	NA	Findings/Comments
Validation Area Visitetinaea AtemicsAbsorption €€	165	140	I WA	
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?				
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.		/		
Wilkshierrar standards (EPA) w 645 Methiow 6020 (EP				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?		7		
If the %Rs were outside the criteria, was a reanalysis performed?				
IX: Regional contents and calculation of the second				<u> </u>
Were performance evaluation (PE) samples performed?		-		
Were the performance evaluation (PE) samples within the acceptance limits?				
XSSarpierResult Verification Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable				
to level IV validation? XFOyeralliassessmentoi saraitae				e de la companya de l
Overall assessment of data was found to be acceptable.				And the state of t
XII SPIEIOBULI (CRESIER STORM, M. CRECOGER)				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.	~			
XIII Gueldolagiesca van en				
Field blanks were identified in this SDG.	/	<u> </u>		
Target analytes were detected in the field blanks.	<u> </u>		<u></u>	

LDC#:	232	52L4
SDG#:	See	Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	of
Reviewer:_	C
2nd Reviewer:	V

METHOD: Metals (EPA Method 6020/7000)

NN NA YN NA

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

	Concentration	n (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	x3	5	RPD	Difference	Limits	(Parent Only)
Arsenic	44.2	6.2	× 38			

V:\FIELD DUPLICATES\FD_inorganic\23252L4.wpd

SDG #: 56600187

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: 2nd Reviewer:

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

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

%R = Found × 100 True

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

Acceptable (Y/N) Reported **%** Recalculated 96 % % True (ug/L) 0,02 Found (ug/L) 38.4 Element E CVAA (Continuing calibration) GFAA (Continuing calibration) ICP (Continuing calibration) ICP/MS (Initial calibration) Type of Analysis GFAA (Initial calibration) CVAA (Initial calibration) ICP (Initial calibration) Standard ID

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.

6

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ICP/MS (Continuing calibation)

7

SDG #: SER COLON LDC # 23252 LY

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: Reviewer:_ 2nd Reviewer:

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

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

%R = Found × 100 True

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

True = Concentration of each analyte in the source.

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

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

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

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

%D = ||-SDR| × 100

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

					Recelculated	Reported	
S Commence	Tymo of Analysis	Element	Found / S / 1	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
TCS AR	ICP interference check	Æ	100 right	78001	POI	100	>
57	Laboratory control sample		18.4	20	26	26	
Q	Matrix spike		(SSR-SR)	7.81	16	dd.	
6/7	Duplicate		٢.22	3	7	7	
	ICP serial dilution		<u> </u>	ためた	3.1) ()	

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.

200

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	L of
Reviewer:_	Ce
2nd reviewer:_	-11

METHOD	THOD: Trace Metals (EPA SW 846 Method 6010/7000)							
Please se Y N N// Y N N// Y N N//	A Are re	ns below for all questions answered results been reported and calculate sults within the calibrated range of detection limits below the CRDL?	ea cor	rrectiv?				
Detected following	analyte resul equation:	ts for	5		were recalculated and	verified using the		
Concentratio	concentration = (RD)(FV)(Dil) Recalculation: (In. Vol.)(%S)							
RD == FV == n. Vol. == Dil == %S ==	Final vo Initial vo Dilution	ia concentration lume (ml) lume (ml) or weight (G) factor percent solids		(100m4/S) 0,93 (1	0.8181814) 04g)	4.2 mg/kg		
Sar	mple ID	Analyte		Reported Concentration (MOTECAL)	Calculated Concentration (m 2 / C9)	Acceptable (Y/N)		
	3	AS		4,2	4,2	7		

			<u> </u>	
Sample ID	Analyte	Reported Concentration (NS/Kgr)	Calculated Concentration (ng/kg/)	Acceptable (Y/N)
3	L AS	4,2	4,2	7
:				

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)	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 280-2400-2

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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

SDG #:_	280-2400-2	
Laborato	rv: Test America	

LDC #: 23252C6

_{Date:} 6-3-1	6
Page:_Lof_	1
Reviewer:	<u>-</u>
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	
III.	Blanks	A	·
IV	Matrix Spike/Matrix Spike Duplicates	N N	Clientspecisied
V	Duplicates	N	
VI.	Laboratory control samples	A	us/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
lX.	Field duplicates	\mathcal{N}	
x	Field blanks	NO	FB=1, EB=Z (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:

	<u> </u>					
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	S:		

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:

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)	А	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

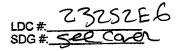
No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tro _DC #: _23252E6				N COMP	PLET			HEET	Date: 6-3-1 Page: C of N Reviewer: C 2nd Reviewer: C
	OD: (Analyte) Perchl							/-!!-l-tion fin	
	amples listed below were ion findings worksheets.		wed for ead	ch of the i	followi	ng vallu	ation areas. v	alidation iiii	dings are noted in attached
	Validation	Area						Comments	
i.	Technical holding times			A	Samp	ling dates	: 4/14/10)	
lla.	Initial calibration			A					
IIb.	Calibration verification			A					
111.	Blanks			A					
IV	Matrix Spike/Matrix Spike D	uplicate	es	A	W	3/D_			
V	Duplicates			B	<u> </u>	<u> </u>	A-12-11-11-11-11-11-11-11-11-11-11-11-11-		
VI.	Laboratory control samples			A	LC.	YD_			
VII.	Sample result verification			A	_				
VIII.	Overall assessment of data			P.					
IX.	Field duplicates			N					<u> </u>
L _x	Field blanks	-		SW	FB-	= FB-0	0-72010-6	(ZC, EB=)	EB-0142010-RIGI-REC
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	•	R = Rin	o compound sate eld blank	ds detec	cted	D = Duplicat TB = Trip bla EB = Equipr		EB-0142010-RIGI-RZC EB-0142010-RIGZ-RZC (SDG# 280-2448-Z)
Validate	ed Samples: Soll	•							
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	
		10				20		30	

Notes:			



VALIDATION FINDINGS CHECKLIST

Page: of Z
Reviewer: C
2nd Reviewer:

Method: Inorganics (EPA Method Seecole)

Method:Inorganics (EPA Method Sector)						
Validation Area	Yes	No	NA	Findings/Comments		
(Admical Actuational Control of the						
All technical holding times were met.						
Cooler temperature critoria was met.		Graphana.				
Were all instruments calibrated daily, each set-up time?			<u> </u>			
Were the proper number of standards used?			<u> </u>			
Were all initial calibration correlation coefficients > 0.995?	/					
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?						
Were titrant checks performed as required? (Level IV only)			_			
Were balance checks performed as required? (Level IV only)	TOTAL					
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) ≤ 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.	<i>_</i>	ſ				
Was an LCS anaytzed for this SDG?						
Was an LCS analyzed per extraction batch?						
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			e a reversion			
Vi. Recurrent anality. Assumine und Chierry, Charles 115						
Were performance evaluation (PE) samples performed?		\Box				
Were the nedomance evaluation (PF) samples within the accentance limits?			_1			

LDC #: 2325286 SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: Zof Z
Reviewer: CC
2nd Reviewer: _____

Validation Area	Yes	No	NA	Findings/Comments
게 Saraple Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were detection limits < RL?		_		
YIE CAVE (ALL MESSESSITIONS OF CHAIR				THE RESIDENCE OF THE PARTY OF T
Overall assessment of data was found to be acceptable.				·
IX Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.			/	
X, Freith-Flacks				
Field blanks were identified in this SDG.	/			·
Target analytes were detected in the field blanks.				

SDG #: See Cover LDC #: 23162F6

VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer: (2nd Reviewer:

Field Blanks

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

METHOD: Inorganics, EPA Method_See Cover

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/14/10 Soil factor applied 10x Y N N/A

Sampling date: 4/14/10 Soil factor applied 10x Field blank / Rinsate / Other:

Associated Samples: All Reason Code: be

Sample Identification NOGRIS **Action Limit** 0.23 EB-04142010-RIG2-RZC (SDG#: 280-2448-2) Blank 1D 2.3 Analyte CI04

100 #: 2383366 spe #: 580 1000

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Method: Inorganics, Method 31

was recalculated.Calibration date: 4/21/10 The correlation coefficient (r) for the calibration of ClOy

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

%R = <u>Found X 100</u>

Where, Found =

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

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.00247			
		s2	2.5	0.00841	0.998766	0.998766	
	\tilde{C}	s3	5	0.01661			>-
	3	84	10	0.03291			
	_	s5	20	0.06345			
		se	40	0.14097			
Calibration verification		ICV	97	Ferd(1844) 18.889	4	1	
Calibration verification		CCV	0	126'6	pg	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._

SECONER LDC #:

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer:

METHOD: Inorganics, Method Secover

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

Where, %R = Found x 100

Found =

True ==

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.

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

RPD = <u>iS-Di</u> x 100 Where, (S+D)/2

Original sample concentration

Duplicate sample concentration " " S Q

					Receiverated	Reported	
Sample ID	Type of Analysis	Element	Found / S / C	True / D (S)	%R / RPD	%R/RPD	Acceptable (Y/N)
527	Laboratory control sample	Clor	21 60.0	78,50,0	1.60	8)-
			•	3	` .)	-
	Matrix spike semple		(8SR-SR)				
7			522	1172	901	∞ ⊙_	
5	Duplicate sample	\rightarrow	08h	125	2		
			-				

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

	2325286
SDG #:	secorer

Page:_	C of
Reviewer:	de_
2nd reviewer:	1/

DC #: <u>C </u>	VALIDATION FINDINGS WORKSHEE Sample Calculation Verification

•	SDG #	: <u>see (o</u> v	Sample Calculation ver	<u>moadori</u>	2nd reviewe		/
			d_Secoull_				
	Y N Y N	N/A Have results N/A Are results w N/A Are all detect	bw for all questions answered "N". Not ap been reported and calculated correctly? ithin the calibrated range of the instrume tion limits below the CRQL? for	ents?	re identified as "i		
fse	Concent E) D Iid	tretion =	Recalculation: (0.07628+ 0.003	0.008	20 2 U	180 mg/l	kg
	#	Sample ID	Analyte	Reported Concentration (MX (X))	Calculated Concentration	Acceptable (Y/N)	
		١	C164	480	480	Ÿ	
			·			·	
	<u> </u>						
	-						
	<u></u>				·		
	 			+			
	<u> </u>						
	-						

Note:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 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

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)	Α

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples 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)				
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)	А	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

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LDC #: 23252F6	VALIDATION COMPLETENESS WORKSHE
SDG #: 280-2771-1	Stage 2B / \
Laboratory: Test America	

Date: 6-3-	O
Page: 1 of 1	
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
l.	Technical holding times	A	Sampling dates: 4/22/10
lla.	Initial calibration	A	
llb.	Calibration verification	A	
111.	Blanks	P	
IV	Matrix Spike/Matrix Spike Duplicates	A	mslp
V	Duplicates	A	Dip
VI.	Laboratory control samples	M	LCS
VII.	Sample result verification	(A)	Not reviewed for ZB
VIII.	Overall assessment of data	PS	
IX.	Field duplicates	SW	(1,3)
X	Field blanks	NO	FB = FB-04132010-RIAGA-RZE

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (290-2400-Z) D = Duplicate

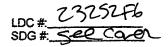
TB = Trip blank

EB = Equipment blank

** Level 4 Validated Samples:

1	SSAM2-01-1BPC **	11	865	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:			



VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: CXZ 2nd Reviewer: _____

Method: Inorganics (EPA Method Second)

Method:Inorganics (EPA Method Sectional)				
Validation Area	Yes	No	NA	Findings/Comments
Constitution and Consti				
All technical holding times were met.	1			
Cooler temperature criteria was met.	1	1		
tracate above				And the second
Were all instruments calibrated daily, each set-up time?	-			
Were the proper number of standards used?		<u>, </u>		
Were all initial calibration correlation coefficients > 0.995?	/	٢		
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?		,		
Were titrant checks performed as required? (Level IV only)		<u> </u>	_	
Were balance checks performed as required? (Level IV only)				
Was a method blank associated with every sample in this SDG?	1			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.)	-	
Marie Control of the				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		`		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		_		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.				
Was an LCS anayized for this SDG?	4			
Was an LCS analyzed per extraction batch?	4			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	1			
VI Recurrence Catality Associated Studies Catality Control Co. 1855 1985 1985 1985				
Were performance evaluation (PE) samples performed?		1		
Were the performance evaluation (PF) samples within the acceptance limits?			1	

LDC #:	2325296
SDG #:_	seewer

VALIDATION FINDINGS CHECKLIST

Page: Zof Z
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2nd Reviewer: _____

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	-			
Were detection limits < RL?	-			
YHE Overall assessment of data				and the second second second
Overall assessment of data was found to be acceptable.	-	-		
X Field duplicates				
Field duplicate pairs were identified in this SDG.	/			·
Target analytes were detected in the field duplicates.		,		
X. Field places				
Field blanks were identified in this SDG.	/		_	
Target analytes were detected in the field blanks.				

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VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:_(of
Reviewer:_	S
2nd Reviewer:_	

Inorganics, Method: See Cover

YN NA YN NA

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

	Concentrati	on (mg/Kg)				Qualification
Analyte	1	3	RPD (≤50)	Difference	Limits	(Parent only)
Perchlorate	0.015	0.011		0.004	(≤0.011)	

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SDG#: 22252 (ASDG)

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Languages: Cal

Method: Inorganics, Method _

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was recalculated.Calibration date: 4/2.1/10 The correlation coefficient (r) for the calibration of $\overline{\mathsf{ClO}_{\mathsf{q}}}$ An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

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

True

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	_	0.0024			
		s2	2.5	0.00841	0.998771	0.998753	
		s3	5	0.01661) ·
	<u>8</u>	84	10	0.03291			_
)	s5	20	0.06345			
	•	sę	40	0.14097			
Calibration verification		ICV	2	989:31	d _y	1	
Calibration verification		733	30	291.62	97	`	\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._

377762 SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

2nd Reviewer: Page: Reviewer:

METHOD: Inorganics, Method Seccored

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

Where, %R = Found x 100

Found =

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

True ==

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

RPD = <u>|S-D|</u> x 100 Where, (S+D)/2

ii ii O

Original sample concentration Duplicate sample concentration

0,0995 102 (C) 102 (C) 102 (C) 103 (C)	·		•			Recalculated	Reported	
Laboratory control sample C [O	Sample ID	Type of Analysis	Element	Found / S (wells) (v) KS	True / D	%R / RPD	%R / RPD	Acceptable (Y/N)
Matrix spike sample Matrix spike sample Duplicate sample Duplicate sample O.101 O.107 O.107 O.107 O.107 O.107 I. 973		Laboratory control sample						
(8587-811) CO-101 CO-10	527		δ Ο	0.101	6,0995	701	Q	7
59 711.0 HOLO		Matrix spike semple		(SSR-SR)				
2007				0.iO	711.0	93	5 5	
		Duplicate semple						
	Q		\rightarrow	1001 1001	0.9125		·)

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.

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LDC # SDG #	#: <u>Seero</u> er	VALIDATION FINDINGS Sample Calculation V		Page Reviewe 2nd reviewe	r: <u> </u>	
	•	Secall				
Y N Y N Y N	N/A Have results N/A Are results w N/A Are all detections ound (analyte) results f	ow for all questions answered "N". Not been reported and calculated correct ithin the calibrated range of the instruction limits below the CRQL? or	ly? ments?	are Identified as " orted with a positiv		
Concer	ntration = Pa-Offset Prop Form Solid	Recalculation:///	0.00371 +0.0009) 0.0034 - 1000 (0.899)		0,015°	8/1c8
#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (MR (C)	Acceptable (Y/N)	
	l	. Clay	0.015	0.015	4	
					·	
-						
				<u> </u>		
-	1			·}	 	l
				·		

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:

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:

	Concentration (mg/Kg)		DDD	D'//		
Analyte	SSAM3-02-1BPC	SSAM3-02-1BPC_FD	RPD (Limits)	Difference (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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Date:	Date: 6-3-10			
Page:_				
Reviewer:	a			
2nd Reviewer:	1~			

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	6	Sampling dates: 4/23/10
lla.	Initial calibration	A	
IIb.	Calibration verification	P	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	m5/D
V	Duplicates	A	OP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(1,5)
Х	Field blanks	NO	(250-22162) (280-2400-2)
	A - Assentable ND - N	la compound	(280-22162) (280-2400-2)

Note:

A = Acceptable

Laboratory: Test America

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (2560-22.162) D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

1	SSAM3-02-1BPC	11	ROS	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	SSAM3-02-1BPCDUP	18		28	38
9		19		29	39
10		20	•	30	40

Notes:		

LDC#:	23252G6
SDC#	See Cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

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Inorganics, Method: See Cover

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

	Concentrati	Concentration (mg/Kg)				Qualification
Analyte	1	5	RPD (≤50)	Difference	Limits	(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

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.
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- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- 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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23252H6 Stage 2B / 4 SDG #: 280-2879-1 Laboratory: Test America

Date: <u>6-3-1</u> 6
Page: <u>Λ</u> of <u> </u>
Reviewer: _ 🕰
2nd Reviewer: \(\sum_{} \)

METHOD: (An	alyte)	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
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	mslp
V	Duplicates	5	00
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	A	Notreviewed for 2B
VIII.	Overall assessment of data	A	
IX.	Field duplicates	V	
x	Field blanks	SW	FB= FB-04072010-RZD, FB04062010-RZB
· · · · · · · · · · · · · · · · · · ·	A - Aggertable NI) = No compound	(280-216-2) (280-2131-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank **Lee14

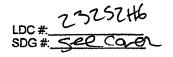
D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

	<u> </u>					
1	SSAJ2-02-1BPC	11	805	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:			



VALIDATION FINDINGS CHECKLIST

Page: Of Z Reviewer: 2

Method: Inorganics (EPA Method Secretary

Method:Inorganics (EPA Method Section ()								
Validation Area	Yes	No	NA	Findings/Comments				
All technical holding times were met.		7						
	╁	 	 					
Coolor temperature criteria was met.								
		7		14 ASS				
Were all instruments calibrated daily, each set-up time?		 	-					
Were the proper number of standards used?	 	,						
Were all initial calibration correlation coefficients ≥ 0.995?	1							
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				·				
Were titrant checks performed as required? (Level IV only)	<u> </u>			,				
Were balance checks performed as required? (Level IV only)	<u> </u>		-					
TESTINETICS OF THE PROPERTY OF								
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.		/	-					
Water section and the section of the								
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.	<i>></i>							
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 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?								
VI Regional Asialis Assurable the Quality Calaba								
Were performance evaluation (PE) samples performed?								
Were the performance evaluation (PF) samples within the acceptance limits?	\Box							

LDC #: 13252+16 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: CC 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIP Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_	_		
Were detection limits < RL?	1			
VIII. Overall susessment of data.				
Overall assessment of data was found to be acceptable.	_	١		
IX Field duplicates				
Field duplicate pairs were identified in this SDG.			,	
Target analytes were detected in the field duplicates.		·	7	
X Field blenks				
Field blanks were identified in this SDG.	7			
Target analytes were detected in the field blanks.				

SDG #: See Cover LDC #: 23204A6

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: 2nd Reviewer.

METHOD: Inorganics, EPA Method See Cover

Were target analytes detected in the field blanks? //L Associated sample units: mg/Kg____ Blank units: ug/L

Were field blanks identified in this SDG?

Y N N/A

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

Associated Samples: 3, Reason Code: bf

			 	 _	
-					
ntification					
Sample Identification					
	de (5 (204)				
	NOGE				
Action Limit		9.2			
Blank ID	FB04062010-RZB (SDG#: 280-2131-28)	92			
Analyte	earth.	CI04			

SDG #: 5200000

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: CS

Method: Inorganics, Method _

2/4/2

was recalculated.Calibration date: 4/2/ (10 The correlation coefficient (r) for the calibration of $\overline{C\!\!\mid\!\!\bigcirc\!\!\mid\!\!\bigcirc\!\!\mid\!\!\bigcirc}$

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

%R = <u>Found X 100</u> True

Where,

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

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/I)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.0025			
		\$2	2.5	0.00841	0.998765	0.998771	•
		s3	5	0.01661)-
		84	10	0.03291			
	5	S5	20	0.06345			_
-		9s	40	0.14097			
Calibration verification		TCO	92	18,890	44	1	
Calibration verification		CCU10	01	4,350	વેત	1	
Calibration verification	\rightarrow	DEN 20	30	B0.62	91	1	>

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.

232521/6 LDC#: 232521/6 SECONER

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: 2nd Reviewer: Reviewer:

METHOD: Inorganics, Method Seccored

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

Where, %R = Found x 100

Found =

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

True ==

RPD = $\frac{1.8 - D_1}{(S + D)/2} \times 100$ Where,

S O

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

Duplicate sample concentration Original sample concentration

-							
	•				Recalculated	Reported	
Sample ID	Type of Analysis	Element	round / S (units)	True / D (units)	Odu / 8%	%R/RPD	Acceptable (Y/N)
	Laboratory control sample						
(2)	•	00 - 00	hh&0'0	0.0990	80	85)_
. ,	Mairix spike sample		(SSR-SR)				
5			49	53.1	<u>G</u>	26	
	Duplicate sample						
		\rightarrow	60	83	7	~	>
		- -				_	

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

	2325246
LDC #:_	
SDG #:	seconor

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	
Reviewer:	C/2
2nd reviewer:	

SDG #: <u>See(O</u> V)	Sample Calculation Verification	2nd reviewer:
METHOD: Inorganics, Method	Secall	
Y N N/A Have results been Are results within the second se	r all questions answered "N". Not applicable questi reported and calculated correctly? the calibrated range of the instruments? mits below the CRQL?	ons are identified as "N/A".
Compound (analyte) results forrecalculated and verified using the		reported with a positive detect were
Concentration = Area Offset (OF)(Prof Fictor) Slope SSOLID	Recalculation: (0.05171 +0.0008) 0.0034 1000	(100)(10) = 17 mg/kg

#	Sample ID	Analyte	Reported Concentration (MY 128	Calculated Concentration	Acceptable (Y/N)
	2	. ClOy	18	h	7
		,			
					·
		·		·	
	·		·		
					-
		·			

Note:_				
			-	

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:

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

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)	А	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	А	bf
280-2960-1	SSAR7-02-5BPC	Perchlorate	0.24J+ mg/Kg	А	bf
280-2960-1	SSAR7-03-1BPC	Perchlorate	1.6J+ mg/Kg	Α	bf
280-2960-1	SSAR7-03-5BPC	Perchlorate	1.1J+ mg/Kg	А	bf
280-2960-1	SSAR7-04-1BPC	Perchlorate	0.58J+ mg/Kg	А	bf
280-2960-1	SSAR7-04-5BPC	Perchlorate	0.48J+ mg/Kg	Α	bf

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23252J6 VALIDATION COMPLETENESS V
SDG #: 280-2960-1 Stage 2B
Laboratory: Test America

Page: of Pag

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: 4/27/10
lla.	Initial calibration	A	
IIb.	Calibration verification	B	
111.	Blanks	K	
IV	Matrix Spike/Matrix Spike Duplicates	N	client specified
V	Duplicates	N	し
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
Lx	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: حن

1	SSAR7-02-1BPC	11	PB5	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:	

1325156 LDC #: 23204N6

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: _____Reviewer: ____2nd Reviewer: _____

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

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

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

Reason Code: bf

				9	0,4857			
)	;	ntification	5	0.58Jt			
2	mples: M \		Sample Identification	7	1.1			
	Associated Samples: 17 1			3	1,63+		-	
•	4			7	0,1754 0,2454 1,654 1.1 34 0,5854 0,4857			
	her:			-	0.1754			
Soil factor applied 10x	Rinsate / Otl		Action Limit		9.2			
6/10 Soil facto	Field blank type: (circle one)(Field Blan) / Rinsate / Other.		Blank ID	FB04062010-RZB (SDG#: 280-2131-29)	92			
Sampling date: 4/6/10			Analyte		CIO4			