LABORATORY DATA CONSULTANTS, INC.
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Northgate Environmental Management, Inc.
1100 Quail Street Ste. 102
Newport Beach, CA 92660
ATTN: Ms. Cindy Arnold

August 17, 2010

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

Dear Ms. Arnold,

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

LDC Project # 23665:

SDG #	Fraction
280-4735-1, 280-4859-1 280-4864-1, 280-4864-3 280-4960-1	Semivolatiles, Chlorinated Pesticides, Arsenic & Manganese, Perchlorate

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

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

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

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

Stage 2B/4

LDC #23665 (Tronox LLC-Northgate, Henderson NV / Tronox PCS)

LDC	SDG#	DATE REC'D	(3) DATE DUE	SVOA (8270C)		Pest. (8081A)		As (6020)		Mn (6020)		CLO_4 (314.0)																									
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	280-4735-1	07/27/10	08/17/10	0	18	-	-	-	-	-	-	-	-																						
A	280-4735-1	07/27/10	08/17/10	0	1	-	-	-	-	-	-	-	-																						
B	280-4859-1	07/27/10	08/17/10	0	2	0	4	0	3	0	4	0	3																						
B	280-4859-1	07/27/10	08/17/10	0	1	0	1	0	1	0	1	0	1																						
C	280-4864-1	07/27/10	08/17/10	3	17	-	-	1	5	-	-	1	10																						
C	280-4864-1	07/27/10	08/17/10	0	4	-	-	0	1	-	-	0	2																						
D	280-4864-3	07/27/10	08/17/10	-	-	-	-	-	-	-	-	0	1																						
E	280-4960-1	07/27/10	08/17/10	1	15	0	1	1	3	-	-	1	3																						
E	280-4960-1	07/27/10	08/17/10	0	1	0	1	0	1	-	-	0	1																						
Total	T/LR			4	59	0	7	2	14	0	5	2	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS/MSD, and DUPs

Tronox LLC Facility, PCS, Henderson, Nevada
Data Validation Reports
LDC #23665

Semivolatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 21, 2010

LDC Report Date: August 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4735-1

Sample Identification

SA33-0.00BPC
SSAN6-06-0.00BPC
SA200-0.00BPC
RSAL8-0.00BPC
RSAK8-0.00BPC
SSAK8-02-0.00BPC
SSAK6-01-0.00BPC
SA198-0.00BPC
RSAH3-0.00BPC
SSAK3-01-0.00BPC
SA82-0.00BPC**
SSAK4-01-0.00BPC
SA70-0.00BPC
SA167-0.00BPC
RSAO3-0.00BPC
SA68-0.00BPC
SSAK5-01-0.00BPC
SA75-0.00BPC
RSAK8-0.00BPC_FD
SA82-0.00BPCMS
SA82-0.00BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 21 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.

Samples FB-04062010-RZB (from SDG 280-2131-2), FB-04072010-RZC (from SDG 280-2280-2), and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	SA33-0.00BPC SA68-0.00BPC
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	RSAL8-0.00BPC RSAK8-0.00BPC SSAK8-02-0.00BPC SSAK6-01-0.00BPC RSAH3-0.00BPC SSAK3-01-0.00BPC SA82-0.00BPC** SSAK4-01-0.00BPC SA70-0.00BPC SA167-0.00BPC RSAO3-0.00BPC SSAK5-01-0.00BPC SA75-0.00BPC RSAK8-0.00BPC_FD

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
RSAH3-0.00BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	Due to lack of resolution between these compounds in the samples, the laboratory performed the quantitation using the total peak area.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-4735-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. 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 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples RSAK8-0.00BPC and RSAK8-0.00BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK8-0.00BPC	RSAK8-0.00BPC_FD				
Benzo(a)anthracene	24	34	-	10 (≤340)	-	-
Benzo(a)pyrene	24	32	-	8 (≤340)	-	-
Benzo(b)fluoranthene	63	83	-	20 (≤340)	-	-
Benzo(g,h,i)perylene	17	29	-	12 (≤340)	-	-
Bis(2-ethylhexyl)phthalate	170	340U	-	170 (≤340)	-	-
Chrysene	36	52	-	16 (≤340)	-	-
Fluoranthene	340U	52	-	288 (≤340)	-	-
Hexachlorobenzene	470	450	-	20 (≤340)	-	-
Indeno(1,2,3-cd)pyrene	340U	24	-	316 (≤340)	-	-
Octachlorostyrene	70	76	-	6 (≤340)	-	-
Pyrene	31	47	-	16 (≤340)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-4735-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4735-1	RSAH3-0.00BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-4735-1	SA33-0.00BPC SSAN6-06-0.00BPC SA200-0.00BPC RSAL8-0.00BPC RSAK8-0.00BPC SSAK8-02-0.00BPC SSAK6-01-0.00BPC SA198-0.00BPC RSAH3-0.00BPC SSAK3-01-0.00BPC SA82-0.00BPC** SSAK4-01-0.00BPC SA70-0.00BPC SA167-0.00BPC RSAO3-0.00BPC SA68-0.00BPC SSAK5-01-0.00BPC SA75-0.00BPC RSAK8-0.00BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-4735-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-4735-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665A2a
SDG #: 280-4735-1
Laboratory: Test America

Date: 8/10/10
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: ~

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/21/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI	Field duplicates	SW	D = 5, 19
XVII.	Field blanks	SW	FB = FB040620 10-RZB (from 280-2131-2) = FB-040720 10-RZC (from 280-2280-2) = FB-040820 10-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: ** Indicates sample underwent Stage 4 validation

Soil

+ 1	SA33-0.00BPC	+ 11	SA82-0.00BPC**	21	SA82-0.00BPCMSD	- 31	MB 280-20552/1-A
+ 2	SSAN6-06-0.00BPC	+ 12	SSAK4-01-0.00BPC	22		- 32	MB 280-21723/1-A
- 3	SA200-0.00BPC	+ 13	SA70-0.00BPC	23		33	
- 4	RSAL8-0.00BPC	+ 14	SA167-0.00BPC	24		34	
+ 5	RSAK8-0.00BPC D	+ 15	RSAO3-0.00BPC	25		35	
+ 6	SSAK8-02-0.00BPC	+ 16	SA68-0.00BPC	26		36	
+ 7	SSAK6-01-0.00BPC	- 17	SSAK5-01-0.00BPC	27		37	
+ 8	SA198-0.00BPC	- 18	SA75-0.00BPC	28		38	
+ 9	RSAH3-0.00BPC	+ 19	RSAK8-0.00BPC_FD D	29		39	
+ 10	SSAK3-01-0.00BPC	20	SA82-0.00BPCMS	30		40	

LDC #: 23665 A2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MK
2nd Reviewer: VV

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 $\geq$ 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) $\leq$ 25% and relative response factors (RRF) $\geq$ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?		✓		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 #: 27665 A2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: M
2nd Reviewer:

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

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 23665 A 2a
SDG #: Sw Cmw

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of
Reviewer: JVG
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: ug/L **Associated sample units:** ug/kg
Sampling date: 4/06/10
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1, 16 (ND)

Compound	Blank ID	Sample Identification								
	FB040620/0-RZB									
EEE	2.7									
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 4/07/10
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 4-7, 9-15, 17, 18, 19

Compound	Blank ID	Sample Identification								
	FB-040720/0-RZD									
EEE	2.2		(Results either ND or > 5X FB)							
CRQL										

5x Phthalates
2x All others

LDC #: 23665 A29

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: JVB

2nd Reviewer:

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

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?

Y (N) N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N (N/A) If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		6	TBP	37 (51-120)	No qual (only 1 out)
				( )	
		11		12 ( )	
				( )	
		15		42 ( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
S3 (TPH) = Terphenyl-d14	18-137	33-141
S4 (PHL) = Phenol-d5	24-113	10-94
S5 (2FP)= 2-Fluorophenol	25-121	21-100
S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 23665 A 29
SDG #: Sa Conn

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: MG
2nd Reviewer: [illegible]

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

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

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		9	GGG, HHH peaks unresolved		J/NJ/P (9)

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23665A2a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: M
2nd Reviewer:

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	5	19				
Benzo(a)anthracene	24	34		10	≤340	
Benzo(a)pyrene	24	32		8	≤340	
Benzo(b)fluoranthene	63	83		20	≤340	
Benzo(g,h,i)perylene	17	29		12	≤340	
bis(2-ethylhexyl)phthalate	170	340U		170	≤340	
Chrysene	36	52		16	≤340	
Fluoranthene	340U	52		288	≤340	
Hexachlorobenzene	470	450		20	≤340	
Indeno(1,2,3-cd)pyrene	340U	24		316	≤340	
Octachlorostyrene	70	76		6	≤340	
Pyrene	31	47		16	≤340	

LDC #: 23665 A2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)		Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/3/2010	1,4-Dioxane	(IS1)	0.6102	0.6102	0.6008	0.6008	5.1	5.07
	MSS K		Naphthalene	(IS2)	1.0418	1.0418	0.9914	0.9914	12.0	11.97
			Dimethyl phthalate	(IS3)	1.2443	1.2443	1.2017	1.2017	7.9	7.86
			Hexachlorobenzene	(IS4)	0.2373	0.2373	0.2237	0.2237	7.1	7.08
			Chrysene	(IS5)	1.0879	1.0879	1.0549	1.0549	8.8	8.79
			Benzo(a)pyrene	(IS6)	1.1315	1.1315	1.0538	1.0538	5.1	5.09

)nc IS/Cpd	Area cpd	Area IS
40/50	161271	211425
40/50	1052210	807956
40/50	720125	462977
40/50	226817	764720
40/50	1110735	816792
40/50	1134417	802029

Conc	1,4-Dioxane	Naphthalene	Dimeth phtha	Hexachloro	Chrysene	Benzo(a)py
4.00	0.6711	1.1335	1.2809		1.1689	0.9886
10.00	0.5864	1.1043	1.3010	0.2427	1.1376	1.0534
20.00	0.5921	1.0824	1.2857	0.2373	1.1410	1.1022
50.00	**0.6102**	**1.0418**	**1.2443**	**0.2373**	**1.0879**	**1.1315**
80.00	0.6003	0.9839	1.2100	0.2228	1.0410	1.0984
120.00	0.5907	0.9067	1.1502	0.2160	0.9807	1.0480
160.00	0.5774	0.8649	1.0871	0.2081	0.9513	1.0196
200.00	0.5780	0.8135	1.0545	0.2020	0.9308	0.9884
X =	0.6008	0.9914	1.2017	0.2237	1.0549	1.0538
S =	0.0304	0.1187	0.0945	0.0158	0.0927	0.0536

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 # 23665A2a

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
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:

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

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Ais = Area of associated internal standard
Cx = Concentration of compound
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)		Average RRF (Initial RRF)	Reported (CC RRF)	Recalculated (CC RRF)	Reported %D	Recalculated %D
1	K4878	07/07/10	1,4-Dioxane	(IS1)	0.6008	0.5928	0.5928	1.3	1.3
			Naphthalene	(IS2)	0.9914	0.9811	0.9811	1.0	1.0
			Dimethyl phthalate	(IS3)	1.2017	1.1658	1.1658	3.0	3.0
			Hexachlorobenzene	(IS4)	0.2237	0.2226	0.2226	0.5	0.5
			Chrysene	(IS5)	1.0549	1.0548	1.0548	0.0	0.0
			Benzo(a)pyrene	(IS6)	1.0538	1.0759	1.0759	2.1	2.1
2									

		CCV1		CCV2	
Compound (Reference IS)		Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	241225	203461		
Naphthalene	(IS2)	40/80	1558552	794306		
Dimethyl phthalate	(IS3)	40/80	1092058	468367		
Hexachlorobenzene	(IS4)	40/80	343831	772369		
Chrysene	(IS5)	40/80	1750464	829765		
Benzo(a)pyrene	(IS6)	40/80	1814453	843187		

LDC #: 23665A29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JM
2nd reviewer: [signature]

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: #11

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	170	81.6	82	82	0
2-Fluorobiphenyl	↓	83.8	84	84	
Terphenyl-d14	↓	87.9	88	88	↓
Phenol-d5	150	126.8	84	84	
2-Fluorophenol	↓	115.5	77	77	
2,4,6-Tribromophenol	↓	18.4	12	12	↓
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 #: 23665 Ara
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JV
2nd Reviewer: [illegible]

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

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

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 20/21

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2620	2600	0	2140	~~2230~~ 2374.6	82	82	84	84	1	1
Pentachlorophenol											
Pyrene	2620	2600	0	2240	2320	85	85	89	89	3	3

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 #: 23665 Arq
SDG #: See Cover

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

Reviewer: JM
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 Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280-21723/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2590	NA	2440	NA	94	94				
Pentachlorophenol										
Pyrene	2590		2600		107	101				

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 #: 23665 A29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JM
2nd reviewer:

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

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

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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

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

I_s = 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 (ul)

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. # 11 , 55 :

Conc. = $\frac{(175430)(40.0)(1.0\ ml)(1000)(\quad)}{(894622)(0.2237)(30.6\ g)(0.986)(\quad)}$

= 1162.1

≈ 1200 ug/kg

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 23, 2010

LDC Report Date: August 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4859-1

Sample Identification

SSAO3-02-5.00BPC
SSAO3-02-7.00BPC
SSAO3-02-9.00BPC**

**Indicates sample underwent Stage 4 review

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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 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 280-4859-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. 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 4 review 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 280-4859-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4859-1	SSAO3-02-5.00BPC SSAO3-02-7.00BPC SSAO3-02-9.00BPC**	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 280-4859-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-4859-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665B2a
SDG #: 280-4859-1
Laboratory: Test America

Date: 8/11/10
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: W

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/23/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 20%
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	FB = FB-04072010-R2C (from 280-2280-2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil

1	SSAO3-02-5.00BPC	11	MB 280-21097/1-A	21		31	
2	SSAO3-02-7.00BPC	12		22		32	
3	SSAO3-02-9.00BPC**	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 #: 23665 B2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SVG
2nd Reviewer: [illegible]

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) ≤ 30% and relative response factors (RRF) ≥ 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				
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 #: 27665 B2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?		✓		
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓		✓	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 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				
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.		✓		

LDC #: 23665B2a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)		Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/3/2010	1,4-Dioxane	(IS1)	0.6102	0.6102	0.6008	0.6008	5.1	5.07
	MSS K		Naphthalene	(IS2)	1.0418	1.0418	0.9914	0.9914	12.0	11.97
			Dimethyl phthalate	(IS3)	1.2443	1.2443	1.2017	1.2017	7.9	7.86
			Hexachlorobenzene	(IS4)	0.2373	0.2373	0.2237	0.2237	7.1	7.08
			Chrysene	(IS5)	1.0879	1.0879	1.0549	1.0549	8.8	8.79
			Benzo(a)pyrene	(IS6)	1.1315	1.1315	1.0538	1.0538	5.1	5.09

nc IS/Cpd	Area cpd	Area IS
40/50	161271	211425
40/50	1052210	807956
40/50	720125	462977
40/50	226817	764720
40/50	1110735	816792
40/50	1134417	802029

Conc	1,4-Dioxane	Naphthalene	Dimeth phtha	Hexachloro	Chrysene	Benzo(a)py
4.00	0.6711	1.1335	1.2809		1.1689	0.9886
10.00	0.5864	1.1043	1.3010	0.2427	1.1376	1.0534
20.00	0.5921	1.0824	1.2857	0.2373	1.1410	1.1022
50.00	**0.6102**	**1.0418**	**1.2443**	**0.2373**	**1.0879**	**1.1315**
80.00	0.6003	0.9839	1.2100	0.2228	1.0410	1.0984
120.00	0.5907	0.9067	1.1502	0.2160	0.9807	1.0480
160.00	0.5774	0.8649	1.0871	0.2081	0.9513	1.0196
200.00	0.5780	0.8135	1.0545	0.2020	0.9308	0.9884
X =	0.6008	0.9914	1.2017	0.2237	1.0549	1.0538
S =	0.0304	0.1187	0.0945	0.0158	0.0927	0.0536

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 # 23665 B2C

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
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:

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

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Ais = Area of associated internal standard
Cx = Concentration of compound
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)		Average RRF (Initial RRF)	Reported (CC RRF)	Recalculated (CC RRF)	Reported %D	Recalculated %D
1	K5006	07/10/10	1,4-Dioxane	(IS1)	0.6008	0.5672	0.5672	5.6	5.6
			Naphthalene	(IS2)	0.9914	0.9726	0.9726	1.9	1.9
			Dimethyl phthalate	(IS3)	1.2017	1.1819	1.1819	1.6	1.6
			Hexachlorobenzene	(IS4)	0.2237	0.2268	0.2268	1.3	1.4
			Chrysene	(IS5)	1.0549	1.0331	1.0331	2.1	2.1
			Benzo(a)pyrene	(IS6)	1.0538	1.0875	1.0875	3.2	3.2
2									

Compound (Reference IS)		CCV1 Concentration (IS/Cpd)	CCV1 Area Cpd	CCV1 Area IS	CCV2 Area Cpd	CCV2 Area IS
1,4-Dioxane	(IS1)	40/80	269321	237424		
Naphthalene	(IS2)	40/80	1787366	918899		
Dimethyl phthalate	(IS3)	40/80	1278154	540703		
Hexachlorobenzene	(IS4)	40/80	405264	893628		
Chrysene	(IS5)	40/80	1911760	925248		
Benzo(a)pyrene	(IS6)	40/80	1972985	907080		

LDC #: 23665 #29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVL
2nd reviewer: [signature]

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: # 3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	79.4	79	79	0
2-Fluorobiphenyl		81.7	82	82	
Terphenyl-d14		88.0	88	88	
Phenol-d5	150	122.6	82	82	
2-Fluorophenol		119.1	79	79	
2,4,6-Tribromophenol		129.3	86	86	
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 #: 23665 B29
SDG #: See Cover

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

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280-21097/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2630	NA	1960	NA	75	75				
Pentachlorophenol										
Pyrene	2630	"	2030	"	77	77				

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 #: 27665#27a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: DM
2nd reviewer: [signature]

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

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

Concentration = $\frac{(A_x)(I_s)(V_i)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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

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

I_s = 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 (ul)

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. _____, MD

Conc. = ( )( )( )( )( ) / ( )( )( )( )( )

=

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 24 through June 25, 2010

LDC Report Date: August 12, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4864-1

Sample Identification

SSAK8-03-5BPC
SSAK8-03-10BPC
SSAK8-03-15BPC**
SSAK8-03-15BBPC_FD
SSAJ8-02-5BPC
SSAJ8-02-10BPC
SSAJ8-02-15BPC**
EB-06252010-RZD
SSAR3-01-2.00BPC
SSAR3-01-3.00BPC
SSAR3-01-4.00BPC**
SSAR4-04-1.00BPC
SSAR4-04-3.00BPC
SSAR4-04-5.00BPC
SSAR4-04-7.00BPC
SSAR4-04-9.00BPC**
SSAR4-04-1.00BPC-FD
SSAJ8-01-6.00BPC
SSAJ8-01-6.00BPC_FD
SSAJ8-01-7.00BPC
SSAJ8-01-8.00BPC
SSAJ8-01-9.00BPC
EB06242010-RZD
EB06242010-RZB
SSAR4-04-3.00BPCMS
SSAR4-04-3.00BPCMSD
SSAJ8-01-7.00BPCMS
SSAJ8-01-7.00BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 25 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280-21081/1-A	6/29/10	Di-n-octylphthalate	1.60 ug/L	All water samples in SDG 280-4864-1

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
EB06242010-RZB	Di-n-octylphthalate	1.8 ug/L	1.8U ug/L

Samples EB-06252010-RZD, EB06242010-RZD, and EB06242010-RZB were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB06242010-RZB	6/24/10	Benzo(a)anthracene	0.55 ug/L	SSAR3-01-2.00BPC
		Benzo(a)pyrene	0.39 ug/L	SSAR3-01-3.00BPC
		Benzo(g,h,i)perylene	0.52 ug/L	SSAR3-01-4.00BPC**
		Benzo(k)fluoranthene	0.61 ug/L	SSAR4-04-1.00BPC
		Bis(2-ethylhexyl)phthalate	0.67 ug/L	SSAR4-04-3.00BPC
		Chrysene	0.73 ug/L	SSAR4-04-5.00BPC
		Dibenz(a,h)anthracene	0.67 ug/L	SSAR4-04-7.00BPC
		Di-n-octylphthalate	1.8 ug/L	SSAR4-04-9.00BPC**
				SSAR4-04-1.00BPC-FD

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

Samples FB04062010-RZB (from SDG 280-2131-2) and FB-04072010-RZD (from SDG 280-2216-2) were identified as field blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	SSAR3-01-2.00BPC
				SSAR3-01-3.00BPC
				SSAR3-01-4.00BPC**
				SSAR4-04-1.00BPC
				SSAR4-04-3.00BPC
				SSAR4-04-5.00BPC
				SSAR4-04-7.00BPC
				SSAR4-04-9.00BPC**
				SSAR4-04-1.00BPC-FD

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	SSAK8-03-5BPC SSAK8-03-10BPC SSAK8-03-15BPC** SSAK8-03-15BBPC_FD SSAJ8-02-5BPC SSAJ8-02-10BPC SSAJ8-02-15BPC** SSAJ8-01-6.00BPC SSAJ8-01-6.00BPC_FD SSAJ8-01-7.00BPC SSAJ8-01-8.00BPC SSAJ8-01-9.00BPC

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) 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

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 280-4864-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. 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 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAK8-03-15BPC** and SSAK8-03-15BBPC_FD, samples SSAR4-04-1.00BPC and SSAR4-04-1.00BPC-FD, and samples SSAJ8-01-6.00BPC and SSAJ8-01-6.00BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ8-01-6.00BPC	SSAJ8-01-6.00BPC_FD				
Dimethylphthalate	140	29	-	111 (≤360)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-4864-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4864-1	SSAK8-03-5BPC SSAK8-03-10BPC SSAK8-03-15BPC** SSAK8-03-15BBPC_FD SSAJ8-02-5BPC SSAJ8-02-10BPC SSAJ8-02-15BPC** EB-06252010-RZD SSAR3-01-2.00BPC SSAR3-01-3.00BPC SSAR3-01-4.00BPC** SSAR4-04-1.00BPC SSAR4-04-3.00BPC SSAR4-04-5.00BPC SSAR4-04-7.00BPC SSAR4-04-9.00BPC** SSAR4-04-1.00BPC-FD SSAJ8-01-6.00BPC SSAJ8-01-6.00BPC_FD SSAJ8-01-7.00BPC SSAJ8-01-8.00BPC SSAJ8-01-9.00BPC EB06242010-RZD EB06242010-RZB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-4864-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-4864-1	EB06242010-RZB	Di-n-octylphthalate	1.8U ug/L	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665C2a
SDG #: 280-4864-1
Laboratory: Test America

Date: 8/11/10
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: W

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24 - 25/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD rr
IV.	Continuing calibration/ICV	A	CW / IW ≤ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS 1
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1* = 3, 4 D_2* = 12, 17 D_3 = 18, 19
XVII.	Field blanks	SW	EB = *8, 23, 24 FB = FB040620 10-RZB (from 280-21311-2) FB-040720 10-RZD (from 280-22118-2)

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: ** Indicates sample underwent Stage 4 validation

Soil + Water

+ 3 1	SSAK8-03-5BPC	S	+ 3 11	SSAR3-01-4.00BPC**	S	+ 2 21	SSAJ8-01-8.00BPC	S	+ 1 31	MB 280-21081/1-A
+ 3 2	SSAK8-03-10BPC		- 3 12	SSAR4-04-1.00BPC	D2	+ 2 22	SSAJ8-01-9.00BPC		- 2 32	MB 280-21110/1-A
- 3 3	SSAK8-03-15BPC**	D1	+ 3 13	SSAR4-04-3.00BPC		- 1 23	EB06242010-RZD	W	- 3 33	MB 280-21097/1-A
- 3 4	SSAK8-03-15BBPC_FD	D1	- 3 14	SSAR4-04-5.00BPC		+ 1 24	EB06242010-RZB		34	
- 3 5	SSAJ8-02-5BPC		+ 3 15	SSAR4-04-7.00BPC		25	SSAR4-04-3.00BPCMS	S	35	
- 3 6	SSAJ8-02-10BPC		+ 3 16	SSAR4-04-9.00BPC**		26	SSAR4-04-3.00BPCMSD		36	
- 3 7	SSAJ8-02-15BPC**		- 3 17	SSAR4-04-1.00BPC-FD	D2	27	SSAJ8-01-7.00BPCMS		37	
- 1 8	EB-06252010-RZD	W	+ 3 18	SSAJ8-01-6.00BPC	D3	28	SSAJ8-01-7.00BPCMSD		38	
+ 3 9	SSAR3-01-2.00BPC	S	+ 2 19	SSAJ8-01-6.00BPC_FD	D3	29			39	
+ 3 10	SSAR3-01-3.00BPC		- 2 20	SSAJ8-01-7.00BPC		30			40	

LDC #: 23665 C2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [signature]

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) ≤ 30% and relative response factors (RRF) ≥ 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.	✓	NA		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 #: 30665 C2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JC
2nd Reviewer: [illegible]

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

VALIDATION FINDINGS WORKSHEET

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

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

COMPNDL

LDC #: 23665 C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: VG
2nd Reviewer: 1

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 6/29/10 **Blank analysis date:** 7/09/10
Conc. units: ug/L Associated Samples: All W

Compound	Blank ID	Sample Identification								
	MB 280-21081/1-A	24								
FFF	1.60		1.8/U							

Blank extraction date: _____ **Blank analysis date:** _____
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 23665 C29
SDG #: Lu Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [illegible]

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: ug/L **Associated sample units:** ug/kg
Sampling date: 8/24/10
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 9-17 (ND)

Compound	Blank ID	Sample Identification								
	24									
CCC	0.55									
III	0.39									
LLL	0.52									
HHH	0.61									
EEE	0.67									
DDD	0.73									
CRQL KKK	0.67									
FFF	1.8									

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 9/06/10
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 9-17 (ND)

Compound	Blank ID	Sample Identification								
	FB040620 10-R2B									
EEE	2.7									
CRQL										

5x Phthalates
2x All others

LDC #: 23665 C2G
SDG #: Sulzer

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
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: ug/L **Associated sample units:** ug/kg
Sampling date: 4/07/10
Field blank type: (circle one) (Field Blank) / Rinsate / Other: Associated Samples: 1-7 18-22 (ND)

Compound	Blank ID	Sample Identification								
	FB-04072010-RZD									
EEE	2.2									
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC #: 27665 C2a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: [signature]

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

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds identified in the field duplicate pairs?

Compound	Concentration (ug/kg) 18	19	RPD
CC	180	29	111 (≤ 360 D)

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 73665C29

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)		Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/3/2010	1,4-Dioxane	(IS1)	0.6102	0.6102	0.6008	0.6008	5.1	5.07
	MSS K		Naphthalene	(IS2)	1.0418	1.0418	0.9914	0.9914	12.0	11.97
			Dimethyl phthalate	(IS3)	1.2443	1.2443	1.2017	1.2017	7.9	7.86
			Hexachlorobenzene	(IS4)	0.2373	0.2373	0.2237	0.2237	7.1	7.08
			Chrysene	(IS5)	1.0879	1.0879	1.0549	1.0549	8.8	8.79
			Benzo(a)pyrene	(IS6)	1.1315	1.1315	1.0538	1.0538	5.1	5.09

Conc IS/Cpd	Area cpd	Area IS
40/50	161271	211425
40/50	1052210	807956
40/50	720125	462977
40/50	226817	764720
40/50	1110735	816792
40/50	1134417	802029

Conc	1,4-Dioxane	Naphthalene	Dimeth phtha	Hexachloro	Chrysene	Benzo(a)py
4.00	0.6711	1.1335	1.2809		1.1689	0.9886
10.00	0.5864	1.1043	1.3010	0.2427	1.1376	1.0534
20.00	0.5921	1.0824	1.2857	0.2373	1.1410	1.1022
50.00	**0.6102**	**1.0418**	**1.2443**	**0.2373**	**1.0879**	**1.1315**
80.00	0.6003	0.9839	1.2100	0.2228	1.0410	1.0984
120.00	0.5907	0.9067	1.1502	0.2160	0.9807	1.0480
160.00	0.5774	0.8649	1.0871	0.2081	0.9513	1.0196
200.00	0.5780	0.8135	1.0545	0.2020	0.9308	0.9884
X =	0.6008	0.9914	1.2017	0.2237	1.0549	1.0538
S =	0.0304	0.1187	0.0945	0.0158	0.0927	0.0536

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 # 23665C29

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
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:

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

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Ais = Area of associated internal standard
Cx = Concentration of compound
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)		Average RRF (Initial RRF)	Reported (CC RRF)	Recalculated (CC RRF)	Reported %D	Recalculated %D
1	K5006	07/10/10	1,4-Dioxane	(IS1)	0.6008	0.5672	0.5672	5.6	5.6
			Naphthalene	(IS2)	0.9914	0.9726	0.9726	1.9	1.9
			Dimethyl phthalate	(IS3)	1.2017	1.1819	1.1819	1.6	1.6
			Hexachlorobenzene	(IS4)	0.2237	0.2268	0.2268	1.3	1.4
			Chrysene	(IS5)	1.0549	1.0331	1.0331	2.1	2.1
			Benzo(a)pyrene	(IS6)	1.0538	1.0875	1.0875	3.2	3.2
2									

Compound (Reference IS)		CCV1 Concentration (IS/Cpd)	CCV1 Area Cpd	CCV1 Area IS	CCV2 Area Cpd	CCV2 Area IS
1,4-Dioxane	(IS1)	40/80	269321	237424		
Naphthalene	(IS2)	40/80	1787366	918899		
Dimethyl phthalate	(IS3)	40/80	1278154	540703		
Hexachlorobenzene	(IS4)	40/80	405264	893628		
Chrysene	(IS5)	40/80	1911760	925248		
Benzo(a)pyrene	(IS6)	40/80	1972985	907080		

LDC #: 23665 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: DM
2nd reviewer: [signature]

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: # 3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	101	77.2	77	77	6
2-Fluorobiphenyl	↓	78.1	78	78	
Terphenyl-d14	↓	~~79.3~~ 79.9	80	80	
Phenol-d5	150	118.2	79	79	
2-Fluorophenol	↓	114.5	76	76	
2,4,6-Tribromophenol	↓	115.3	77	77	↓
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 #: 23665 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVB
2nd Reviewer: [signature]

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

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

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 27/28

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2890	2910	0	2290	2220	79	79	76	76	3	3
Pentachlorophenol											
Pyrene	2890	2910	0	2370	2410	82	82	83	83	2	2

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 #: 27665 C2a
SDG #: See Cover

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

Reviewer: JM
2nd Reviewer: LA

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

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS-280-21097/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2630	NA	1966.6	NA	76	75				
Pentachlorophenol										
Pyrene	2630	"	2030	"	77	77				

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 #: 73665C2A
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JM
2nd reviewer: [illegible]

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

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

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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

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

I_s = 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 (ul)

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #16, CC:

Conc. = $\frac{(52363)(40)(1ml)(1000)(\quad)}{(502630)(1.2017)(30.2g)(6.931)(\quad)}$

= 123.3

≈ 120 ng/kg

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 29 through June 30, 2010

LDC Report Date: August 11, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4960-1

Sample Identification

SA94-0BPC
SA105-0BPC
SSAK3-06-1BPC
SSAK3-06-2BPC
SSAJ2-05-1BPC
SSAJ2-05-5BPC_FD
SSAJ2-05-5BPC
SSAJ2-05-10BPC**
SSAK5-05-1BPC
SSAK5-05-9BPC
SSAK6-05-1BPC
SSAK6-05-1BPC_FD
SSAK6-06-1BPC
SSAO5-05-5BPC
SSAO5-05-7BPC
SSAO5-05-9BPC
EB-06292010-RZD
SSAJ2-05-1BPCMS
SSAJ2-05-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 18 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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 with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280-21500/1-A	7/1/10	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Di-n-octylphthalate Fluoranthene	0.597 ug/L 0.530 ug/L 0.657 ug/L 0.681 ug/L 0.621 ug/L 1.90 ug/L 0.341 ug/L	All water samples in SDG 280-4960-1
MB 280-21548/1-A	7/1/10	Bis(2-ethylhexyl)phthalate Dimethylphthalate	96.7 ug/Kg 38.9 ug/Kg	All soil samples in SDG 280-4960-1

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA94-0BPC (4X)	Bis(2-ethylhexyl)phthalate	550 ug/Kg	550U ug/Kg
SA105-0BPC	Dimethylphthalate	30 ug/Kg	30U ug/Kg
SSAK3-06-1BPC	Bis(2-ethylhexyl)phthalate	96 ug/Kg	96U ug/Kg
SSAK3-06-2BPC	Bis(2-ethylhexyl)phthalate	95 ug/Kg	95U ug/Kg
SSAJ2-05-1BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	150 ug/Kg 100 ug/Kg	150U ug/Kg 100U ug/Kg
SSAJ2-05-5BPC_FD	Bis(2-ethylhexyl)phthalate Dimethylphthalate	110 ug/Kg 26 ug/Kg	110U ug/Kg 26U ug/Kg
SSAJ2-05-5BPC	Bis(2-ethylhexyl)phthalate	97 ug/Kg	97U ug/Kg
SSAK5-05-9BPC	Bis(2-ethylhexyl)phthalate	95 ug/Kg	95U ug/Kg
SSAK6-05-1BPC	Bis(2-ethylhexyl)phthalate	93 ug/Kg	93U ug/Kg
SSAK6-05-1BPC_FD	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92 ug/Kg 39 ug/Kg	92U ug/Kg 39U ug/Kg
SSAO5-05-5BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	180 ug/Kg 47 ug/Kg	180U ug/Kg 47U ug/Kg

Sample EB-06292010-RZD was identified as an equipment blank. No semivolatile contaminants were found in this blank.

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB-04072010-RZD	4/7/10	Bis(2-ethylhexyl)phthalate	2.2 ug/L	SSAK3-06-1BPC SSAK3-06-2BPC SSAJ2-05-1BPC SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAJ2-05-10BPC** SSAK5-05-1BPC SSAK5-05-9BPC SSAK6-05-1BPC SSAK6-05-1BPC_FD SSAK6-06-1BPC

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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 with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SA94-0BPC SA105-0BPC SSAJ2-05-5BPC_FD SSAK6-05-1BPC SSAO5-05-5BPC SSAO5-05-7BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	Due to lack of resolution between these compounds in the samples, the laboratory performed the quantitation using the total peak area.	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-4960-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. 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 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SSAJ2-05-5BPC_FD and SSAJ2-05-5BPC and samples SSAK6-05-1BPC and SSAK6-05-1BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ2-05-5BPC_FD	SSAJ2-05-5BPC				
Benzo(a)anthracene	370U	23	-	347 (≤370)	-	-
Benzo(a)pyrene	370U	70	-	300 (≤370)	-	-
Benzo(b)fluoranthene	42	39	-	3 (≤370)	-	-
Bis(2-ethylhexyl)phthalate	110	97	-	13 (≤370)	-	-
Dimethylphthalate	26	360U	-	334 (≤370)	-	-
Hexachlorobenzene	3700	920	-	2780 (≤370)	J (all detects)	A
Octachlorostyrene	1500	410	-	1090 (≤370)	J (all detects)	A
Phenanthrene	370U	30	-	340 (≤370)	-	-
Pyrene	13	35	-	22 (≤370)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAK6-05-1BPC	SSAK6-05-1BPC_FD				
Benzo(b)fluoranthene	31	360U	-	329 (≤360)	-	-
Bis(2-ethylhexyl)phthalate	93	92	-	1 (≤360)	-	-
Dimethylphthalate	360U	39	-	321 (≤360)	-	-
Hexachlorobenzene	9100	1500	-	7600 (≤1500)	J (all detects)	A
Octachlorostyrene	1200	550	-	650 (≤360)	J (all detects)	A

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG 280-4960-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4960-1	SA94-0BPC SA105-0BPC SSAJ2-05-5BPC_FD SSAK6-05-1BPC SSAO5-05-5BPC SSAO5-05-7BPC	Benzo(b)fluoranthene Benzo(k)fluoranthene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Compound quantitation and CRQLs (q)
280-4960-1	SA94-0BPC SA105-0BPC SSAK3-06-1BPC SSAK3-06-2BPC SSAJ2-05-1BPC SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAJ2-05-10BPC** SSAK5-05-1BPC SSAK5-05-9BPC SSAK6-05-1BPC SSAK6-05-1BPC_FD SSAK6-06-1BPC SSAO5-05-5BPC SSAO5-05-7BPC SSAO5-05-9BPC EB-06292010-RZD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-4960-1	SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAK6-05-1BPC SSAK6-05-1BPC_FD	Hexachlorobenzene Octachlorostyrene	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-4960-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-4960-1	SA94-0BPC (4X)	Bis(2-ethylhexyl)phthalate	550U ug/Kg	A	bl
280-4960-1	SA105-0BPC	Dimethylphthalate	30U ug/Kg	A	bl
280-4960-1	SSAK3-06-1BPC	Bis(2-ethylhexyl)phthalate	96U ug/Kg	A	bl
280-4960-1	SSAK3-06-2BPC	Bis(2-ethylhexyl)phthalate	95U ug/Kg	A	bl
280-4960-1	SSAJ2-05-1BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	150U ug/Kg 100U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-4960-1	SSAJ2-05-5BPC_FD	Bis(2-ethylhexyl)phthalate Dimethylphthalate	110U ug/Kg 26U ug/Kg	A	bl
280-4960-1	SSAJ2-05-5BPC	Bis(2-ethylhexyl)phthalate	97U ug/Kg	A	bl
280-4960-1	SSAK5-05-9BPC	Bis(2-ethylhexyl)phthalate	95U ug/Kg	A	bl
280-4960-1	SSAK6-05-1BPC	Bis(2-ethylhexyl)phthalate	93U ug/Kg	A	bl
280-4960-1	SSAK6-05-1BPC_FD	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92U ug/Kg 39U ug/Kg	A	bl
280-4960-1	SSAO5-05-5BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	180U ug/Kg 47U ug/Kg	A	bl

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665E2a
SDG #: 280-4960-1
Laboratory: Test America

Date: 8/10/16
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/29-30/16
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 6.7 D_2 = 11, 12
XVII.	Field blanks	SW	*EB = 17 FB = *FB-04072010-RZC (from 280-2280-2) ↓ = 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: ** Indicates sample underwent Stage 4 validation

Soil + Water

1	SA94-0BPC.. S	11	SSAK6-05-1BPC.. D_2 S	21	MB 280-21548/1-A	31	
2	SA105-0BPC..	12	SSAK6-05-1BPC..FD D_2	22	MB 280-21500/1-A	32	
3	SSAK3-06-1BPC..	13	SSAK6-06-1BPC..	23		33	
4	SSAK3-06-2BPC..	14	SSAO5-05-5BPC..	24		34	
5	SSAJ2-05-1BPC..	15	SSAO5-05-7BPC..	25		35	
6	SSAJ2-05-5BPC..FD D_1	16	SSAO5-05-9BPC..	26		36	
7	SSAJ2-05-5BPC.. D_1	17	EB-06292010-RZD W	27		37	
8	SSAJ2-05-10BPC..**	18	SSAJ2-05-1BPC..MS S	28		38	
9	SSAK5-05-1BPC..	19	SSAJ2-05-1BPC..MSD	29		39	
10	SSAK5-05-9BPC..	20		30		40	

NO surr. in ID's

LDC #: 23665 E2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JM
2nd Reviewer: [illegible]

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) ≤ 30% and relative response factors (RRF) ≥ 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				
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 #: 23685 E2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JM
2nd Reviewer: [illegible]

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

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 23665 E2a
SDG #: La Clara

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: W

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

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 7/01/10 **Blank analysis date:** 7/11/10
Conc. units: ug/L Associated Samples: All W (ND)

Compound	Blank ID	Sample Identification								
	MB 280-21500/1-A									
CCC	0.597									
III	0.530									
GGG	0.657									
LL	0.681									
HHH	0.621									
FFF	1.90									
YY	0.341									

Blank extraction date: 7/01/10 **Blank analysis date:** 7/12/10
Conc. units: ug/kg Associated Samples: All S (bl)

Compound	Blank ID	Sample Identification								
	MB 280-21548/1-A	1 (4x)	2	3	4	5	6	7	10	
5x EEE	96.7		550/U	(540)	96/U	95/U	150/U	110/U	97/U	95/U
483.5 CC	38.9			30/U			100/U	26/U		

5x Phthalates
2x all others

LDC #: 23665E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVB
2nd Reviewer: [signature]

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

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 7/01 **Blank analysis date:** 7/12/10
Conc. units: ug/Kg Associated Samples: All S (b l)

Compound	Blank ID	Sample Identification								
	MB 280-21548/1-A	11	12	14						
5x										
4835 EEE	96.7	93/4	92/4	180/4						
194.5 CC	38.9		39/4	47/4						

Blank extraction date: _____ **Blank analysis date:** _____
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 23665E2a
SDG #: Sa Cruz

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: DVL
2nd Reviewer: [signature]

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: ug/L **Associated sample units:** ug/kg
Sampling date: 4/07/10
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: 3 - 13

Compound	Blank ID	Sample Identification								
	FB-04072010-RZD									
EEE	2,2		Results	either	ND	or	> 5X	FB		
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x All others

LDC #: 23665 E2a
SDG #: San Cove

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: [signature]

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

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

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 2, 6, 11, 14, 15	GGG, HHH peaks	unresolved	J/NJ/P (3)

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23665E2a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JM
2nd Reviewer: [signature]

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

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

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	6	7				
Benzo(a)anthracene	370U	23		347	≤370	
Benzo(a)pyrene	370U	70		300	≤370	
Benzo(b)fluoranthene	42	39		3	≤370	
bis(2-ethylhexyl)phthalate	110	97		13	≤370	
Dimethylphthalate	26	360U		334	≤360	
Hexachlorobenzene	3700	920		2780	≤370	Jdet/A (fd)
Octachlorostyrene	1500	410		1090	≤370	Jdet/A (fd)
Phenanthrene	370U	30		340	≤370	
Pyrene	13	35		22	≤370	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	11	12				
Benzo(b)fluoranthene	31	360U		329	≤360	
bis(2-ethylhexyl)phthalate	93	92		1	≤360	
Dimethylphthalate	360U	39		321	≤360	
Hexachlorobenzene	9100	1500		7600	≤1500	Jdets/A (fd)
Octachlorostyrene	1200	550		650	≤360	Jdets/A (fd)

V:\FIELD DUPLICATES\23665E2a.wpd

LDC #: 23665 #29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer:

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)		Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/9/2010	1,4-Dioxane	(IS1)	0.6158	0.6158	0.5956	0.5956	2.8	2.76
	MSS Y		Naphthalene	(IS2)	1.1410	1.1410	1.1052	1.1052	2.7	2.67
			Fluorene	(IS3)	1.3341	1.3341	1.3194	1.3194	5.2	5.16
			Hexachlorobenzene	(IS4)	0.2154	0.2154	0.2182	0.2182	7.6	7.56
			Chrysene	(IS5)	1.1756	1.1756	1.1400	1.1400	3.1	3.07
			Benzo(g,h,i)perylene	(IS6)	1.0634	1.0634	1.0173	1.0173	11.9	11.87

Conc IS/Cpd	Area cpd	Area IS
40/50	143983	187040
40/50	1000260	701327
40/50	770171	461853
40/50	206297	766351
40/50	1218972	829504
40/50	901732	678395

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00		1.0527	1.2274		1.1604	0.8221
10.00	0.5996	1.0843	1.2423	0.1927	1.0615	0.8684
20.00	0.6031	1.0832	1.2677	0.2019	1.1548	0.9555
50.00	**0.6158**	**1.1410**	**1.3341**	**0.2154**	**1.1756**	**1.0634**
80.00	0.6052	1.1309	1.3357	0.2218	1.1451	1.0701
120.00	0.5837	1.1093	1.3525	0.2230	1.1496	1.0933
160.00	0.5964	1.1203	1.3698	0.2344	1.1234	1.1148
200.00	0.5654	1.1198	1.4256	0.2385	1.1497	1.1507
X =	0.5956	1.1052	1.3194	0.2182	1.1400	1.0173
S =	0.0165	0.0295	0.0681	0.0165	0.0350	0.1208

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 # 23665 Era

VALIDATION FINDINGS WORSHEET
Continuing Calibration Results Verification

Reviewer: JVG
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:

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

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Ais = Area of associated internal standard
Cx = Concentration of compound
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)	Average RRF (Initial RRF)	Reported (CC RRF)	Recalculated (CC RRF)	Reported %D	Recalculated %D
1	Y3290	07/12/10	1,4-Dioxane (IS1)	0.5956	0.5723	0.5723	3.9	3.9
			Naphthalene (IS2)	1.1052	1.1067	1.1067	0.1	0.1
			Fluorene (IS3)	1.3194	1.3513	1.3513	2.4	2.4
			Hexachlorobenzene (IS4)	0.2182	0.2193	0.2193	0.5	0.5
			Chrysene (IS5)	1.1400	1.1519	1.1519	1.0	1.0
			Benzo(g,h,i)perylene (IS6)	1.0173	1.0800	1.0800	6.2	6.2

Compound (Reference IS)	Concentration (IS/Cpd)	Area Cpd	Area IS
1,4-Dioxane (IS1)	40/80	222838	194703
Naphthalene (IS2)	40/80	1722369	778131
Fluorene (IS3)	40/80	1397190	516987
Hexachlorobenzene (IS4)	40/80	381941	870926
Chrysene (IS5)	40/80	2250409	976865
Benzo(g,h,i)perylene (IS6)	40/80	1746301	808463

LDC #: 23665 #29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JK
2nd reviewer:

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: # 8

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	86.7	87	87	0
2-Fluorobiphenyl	↓	72.5	77	77	
Terphenyl-d14	↓	97.7	98	98	↓
Phenol-d5	150	124.6	83	83	
2-Fluorophenol	↓	123.9	83	83	
2,4,6-Tribromophenol	↓	111.7	74	74	↓
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID: _____

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

Sample ID: _____

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

LDC #: 23665 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: LW

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

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

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD samples: 18 /19

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	3320	3290	0	2430	2380	73	73	72	72	2	2
Pentachlorophenol											
Pyrene	3320	3290	↓	2430	2340	73	73	71	71	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 #: 23665E2a
SDG #: See Cover

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

Page: 1 of 1
Reviewer: JM
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 Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 280 - 21548/2-A

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2580	NA	1850		72	72				
Pentachlorophenol		↓								
Pyrene	2580	↓	2000		78	78				

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 #: 23665E26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

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

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

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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

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

I_s = 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 (ul)

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. # 8 , SS:

Conc. = $\frac{(11571)(40)(1.0\,ml)(1000)(\quad)}{(70697)(0.218\,\gamma)(30.4)(0.916)(\quad)}$

= 107. γ

$\approx$ 110 ug/L

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

Tronox LLC Facility, PCS, Henderson, Nevada
Data Validation Reports
LDC #23665

Chlorinated Pesticides

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 23, 2010

LDC Report Date: August 12, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4859-2

Sample Identification

RSAQ4-3.00BPC
RSAQ4-5.00BPC
RSAQ4-7.00BPC
RSAQ4-9.00BPC**
RSAQ4-3.00BPC_FD
RSAQ4-7.00BPCMS
RSAQ4-7.00BPCMSD
RSAQ4-3.00BPC_FDMS
RSAQ4-3.00BPC_FDMSD

**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 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.

No field blanks were identified 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

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 some compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. 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 280-4859-2	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAQ4-3.00BPC and RSAQ4-3.00BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAQ4-3.00BPC	RSAQ4-3.00BPC_FD				
4,4'-DDE	2.2	2.0	-	0.2 (≤9.2)	-	-
4,4'-DDT	6.2	5.4	-	0.8 (≤9.2)	-	-
alpha-BHC	1.1	9.2U	-	8.1 (≤9.2)	-	-
beta-BHC	57	43	-	14 (≤9.2)	J (all detects)	A
Hexachlorobenzene	1.4	9.2U	-	7.8 (≤9.2)	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-4859-2

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4859-2	RSAQ4-3.00BPC RSAQ4-5.00BPC RSAQ4-7.00BPC RSAQ4-9.00BPC** RSAQ4-3.00BPC_FD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
280-4859-2	RSAQ4-3.00BPC RSAQ4-3.00BPC_FD	beta-BHC	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-4859-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-4859-2

No Sample Data Qualified in this SDG

LDC #: 23665B3a
SDG #: 280-4859-1
Laboratory: Test America

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 8/11/10
Page: 1 of 1
Reviewer: JVb
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/23/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	r2
IV	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI	Surrogate spikes	A	
VII	Matrix spike/Matrix spike duplicates	SW	
VIII	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI	Target compound identification	A	Not reviewed for Stage 2B validation.
XII	Compound quantitation and reported CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 1 5
XV.	Field blanks	N	

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: ** Indicates sample underwent Stage 4 validation

1	RSAQ4-3.00BPC Soil D	11	MB 280-21131/1-A	21		31	
2	RSAQ4-5.00BPC	12		22		32	
3	RSAQ4-7.00BPC	13		23		33	
4	RSAQ4-9.00BPC**	14		24		34	
5	RSAQ4-3.00BPC_FD D	15		25		35	
6	RSAQ4-7.00BPCMS	16		26		36	
7	RSAQ4-7.00BPCMSD	17		27		37	
8	RSAQ4-3.00BPC_FDMS	18		28		38	
9	RSAQ4-3.00BPC_FDMSD	19		29		39	
10		20		30		40	

LDC #: 27665 B3c
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: W

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
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) ≤ 20%?	W	✓		
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or ____%R	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 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.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 23665B3c
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
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				
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-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (tech)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. ~~DB-608~~ 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. ~~DB-1701~~ 2,4'-DDE	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes: _____

LDC #: 23665 B3a
SDG #: See Cover

Reviewer: JVG
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

(Y) N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		6/7 (10X)	B	-470 (58-115)	-604 (58-115)	( )	3	No qual (LCS also in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		8/9 (5X)	U	NC (54-135)	NC (54-135)	( )	1	No qual (LCS also in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 23665 B3c
SDG #: Sa Conv

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: DVG
2nd reviewer:

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in thie field duplicate pairs?

Compound	Concentration (ug/kg)		RPD (Parent only)
	1	5	
J	2.2	2.8	0.2 (≤ 9.2D)
O	6.2	5.4	0.8
A	1.1	9.2 U	8.1
B	57	43	14
FF	~~8.8~~ 1.4	9.2 U	7.8

J ~~NJ~~ ~~A~~ (fd)
J ~~NJ~~ A (fd)

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC # 23665 B3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVC
2nd Reviewer: [signature]

METHOD: GC EPA SW 846 Method 8081A

Parameter: g-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
06/29/2010	RTI-XLB	g-BHC	122560.00	4.00	16.00	30640.00
			307596.00	10.00	100.00	30759.60
	GCS_C		738566.00	25.00	625.00	29542.64
			1426013.00	50.00	2500.00	28520.26
			2028332.00	75.00	5625.00	27044.43
			2654330.00	100.00	10000.00	26543.30
					Ave RF	28841.70

Regression Output:			Reported	
Constant		11414.20584	c =	NR
Std Err of Y Est		16515.67468		
R Squared		0.99984	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	29725.029962	-33.843748	b =	NR
Std Err of Coef.	789.337008	7.56		

LDC # 23665 B39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	X Area	Y Conc	X^2	
06/29/2010	RTI-XLB	4,4'-DDT	63410.00	4.00		15852.50
			175756.00	10.00		17575.60
	GCS_C		469540.00	25.00		18781.60
			979235.00	50.00		19584.70
			1457421.00	75.00		19432.28
			1960060.00	100.00		19600.60
					Ave RF	18471.21

Regression Output:			Reported	
Constant		0.00000	c =	1.00000
Std Err of Y Est		14489.31386		
R Squared		0.99963	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
			m1 =	19615
X Coefficient(s)	19507.263066	0.444903		
Std Err of Coef.	105.489177	0.11		

LDC # 23665 B3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV6
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: g-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
06/29/2010	RTI-35silms	g-BHC	140307.00	4.00		35076.75
			348407.00	10.00		34840.70
	GCS_C		856787.00	25.00		34271.48
			1688247.00	50.00		33764.94
			2474905.00	75.00		32998.73
			3254088.00	100.00		32540.88
					Ave RF	33915.58

Regression Output:			Reported	
Constant		0.00000	c =	0.00000
Std Err of Y Est		31114.16048		
R Squared		0.99937	r2 =	0.999500
No. of Observations		6.00000		
Degrees of Freedom		5.00000		
			m1 =	33321
X Coefficient(s)	32911.268843	0.444903		
Std Err of Coef.	226.526061	0.11		

LDC # 29665 B9a
SDG# Sw Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SV
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDT

Date	Column	Compound	X Area	Y Conc	X^2	
06/29/2010	RTI-35silms	4,4'-DDT	93261.00	4.00	16.00	23315.25
			236414.00	10.00	100.00	23641.40
	GCS_C		595206.00	25.00	625.00	23808.24
			1201442.00	50.00	2500.00	24028.84
			1753584.00	75.00	5625.00	23381.12
			2345896.00	100.00	10000.00	23458.96
					Ave RF	23605.64

Regression Output:			Reported	
Constant		-3355.77251	c =	NR
Std Err of Y Est		12345.46710		
R Squared		0.99989	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	24211.079197	-7.727514	b =	NR
Std Err of Coef.	590.029427	5.65		

LDC #73665B39
SDG# See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: 1a

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

#	Standard ID	Calibration Date	Compound		CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	005F0501	7/9/2010	g-BHC	RTI-XLB	50	50.70	50.70	1.4	1.4
			4,4'-DDT	RTI-XLB	50	49.80	49.01	0.4	2.0
			g-BHC	RTI-35sil	50	51.90	52.17	3.8	4.3
			4,4'-DDT	RTI-35sil	50	49.90	49.89	0.2	0.2
2									

Compound		a	b	c	CCV1 Area	CCV2 Area
g-BHC	RTI-XLB	-33.843748	29725.03	11414.20584	1431357	
4,4'-DDT	RTI-XLB		19615.00		961274	
g-BHC	RTI-35sil		33321.00		1738228	
4,4'-DDT	RTI-35sil	-7.727514	24211.08	-3355.77251	1185275	

LDC #: 23665B3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: ML
2nd reviewer: [illegible]

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #4

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene		20	17.7	88	88	0
Decachlorobiphenyl		↓	18.1	90	90	↓
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 #: 23665 B39
SDG #: Sa Cor

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: DVG
2nd Reviewer: [illegible]

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

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

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

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration

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

MS = Matrix spike percent recovery; MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 6/7

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	18.1	18.2	0	16.8	17.8	93	93	98	95	5	6
4,4'-DDT	↓	↓	16.55	30.07	30.91	74	74	79	79	3	3
Aroclor 1260											

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

LDC #: 23665 B39
SDG #: Eco Core

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

Reviewer: DVG
2nd Reviewer: LW

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

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

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

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

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

LCS/LCSD samples: LCS 280 - 21101/2-A

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.3	NA	15.9	NA	98	98				
4,4'-DDT	↓	↓	17.1	↓	105	105				
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 #: 28665 B3a
SDG #: San Cor

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: DK
2nd reviewer: [illegible]

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

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

Example:

Sample I.D. _____ ND:

Conc. = _____

=

#	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: June 29, 2010

LDC Report Date: August 11, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4960-1

Sample Identification

SSAL3-06-1BPC
SSAL3-06-2BPC**
SSAL3-06-1BPCMS
SSAL3-06-1BPCMSD
SSAL3-06-2BPCMS
SSAL3-06-2BPCMSD

**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 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

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

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 some compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. 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 280-4960-1	All compounds reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG 280-4960-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-4960-1	SSAL3-06-1BPC SSAL3-06-2BPC**	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 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665E3a
SDG #: 280-4960-1
Laboratory: Test America

Date: 8/10/10
Page: 1 of 1
Reviewer: JW
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
I.	Technical holding times	A	Sampling dates: 6/29/10
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	r²
IV	Continuing calibration/ICV	A	CCV/CV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB-04072010-RZD (from 280-22116-2)

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: ** Indicates sample underwent Stage 4 validation

Soil

1	SSAL3-06-1BPC	11	MB 280-21544/1-A	21		31	
2	SSAL3-06-2BPC**	12		22		32	
3	SSAL3-06-1BPC MS	13		23		33	
4	SSAL3-06-1BPC MSD	14		24		34	
5	SSAL3-06-2BPC MS	15		25		35	
6	SSAL3-06-2BPC MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #:_____
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: V

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
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) ≤ 20%?		✓		
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	✓			
Did the initial calibration meet the curve fit acceptance criteria?	✓			
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ___%D or ___%R	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 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.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #:_____
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: LW

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				
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.		✓		

LDC # 23665 E3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: M
2nd Reviewer: L

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDE

Date	Column	Compound	X Area	Y Conc	X^2	
07/14/2010	CLP1	4,4'-DDE	24777.00	4.00	16.00	6194.25
			60820.00	10.00	100.00	6082.00
	GCS_P1		166083.00	25.00	625.00	6643.32
			367629.00	50.00	2500.00	7352.58
			553591.00	75.00	5625.00	7381.21
			746237.00	100.00	10000.00	7462.37
					Ave RF	6852.62

Regression Output:			Reported	
Constant		-10028.67169	c =	NR
Std Err of Y Est		6780.30600		
R Squared		0.99967	r2 =	0.999700
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	7302.996652	2.720127	b =	NR
Std Err of Coef.	324.052547	3.10		

LDC # 23665 E39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer:

METHOD: GC EPA SW 846 Method 8081A

Parameter: g-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
07/14/2010	CLP1	g-BHC	41036.00	4.00	16.00	10259.00
			98040.00	10.00	100.00	9804.00
	GCS_P1		245241.00	25.00	625.00	9809.64
			493759.00	50.00	2500.00	9875.18
			718059.00	75.00	5625.00	9574.12
			944144.00	100.00	10000.00	9441.44
					Ave RF	9793.90

Regression Output:			Reported	
Constant		-1618.43608	c =	NR
Std Err of Y Est		3884.46394		
R Squared		0.99993	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	10179.374760	-7.281105	b =	NR
Std Err of Coef.	185.650977	1.78		

LDC #23665 EB9

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVC
2nd Reviewer: h

METHOD: GC EPA SW 846 Method 8081A

Parameter: 4,4'-DDE

Date	Column	Compound	X Area	Y Conc	X^2	
07/14/2010	CLP2	4,4'-DDE	41028.00	4.00	16.00	10257.00
			94871.00	10.00	100.00	9487.10
	GCS_P1		230539.00	25.00	625.00	9221.56
			457518.00	50.00	2500.00	9150.36
			667703.00	75.00	5625.00	8902.71
			881337.00	100.00	10000.00	8813.37
					Ave RF	9305.35

Regression Output:			Reported	
Constant		3336.23022	c =	NR
Std Err of Y Est		2686.14587		
R Squared		0.99996	r2 =	1.000000
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	9266.520668	-4.949795	b =	NR
Std Err of Coef.	128.379518	1.23		

LDC # 23665E39

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JV6
2nd Reviewer: [illegible]

METHOD: GC EPA SW 846 Method 8081A

Parameter: g-BHC

Date	Column	Compound	X Area	Y Conc	X^2	
07/14/2010	CLP2	g-BHC	45221.00	4.00	16.00	11305.25
			105794.00	10.00	100.00	10579.40
	GCS_P1		266409.00	25.00	625.00	10656.36
			516454.00	50.00	2500.00	10329.08
			741495.00	75.00	5625.00	9886.60
			968090.00	100.00	10000.00	9680.90
					Ave RF	10406.27

Regression Output:			Reported	
Constant		1508.72604	c =	NR
Std Err of Y Est		4305.62745		
R Squared		0.99992	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
			a =	NR
X Coefficient(s)	10813.705547	-11.682796	b =	NR
Std Err of Coef.	205.779731	1.97		

LDC # 23665 E24

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MB
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

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	005F0501	7/20/2010	4,4'-DDE CLP1	50	52.5	52.6	5.2	5.2
			g-BHC CLP1	50	50.5	50.5	1.1	1.1
			4,4'-DDE CLP2	50	48.0	48.0	4.0	4.0
			g-BHC CLP2	50	48.6	48.6	2.8	2.8
2								

Y = a (X^2) + b X + c

Calculation

	Area Y	a	b	c	Conc. X	final conc	T = Y-c	(b^2 - 4aT)	( )^ 1/2	(-b+ ()) / 2a	(-b -())/ 2a
dde clp1 7/20	381458	2.70127	7302.99665	-10028.67169	52.58356		-391486.6717	57563805	7587.08145	52.5835619	-2756.12547
g-BHC clp1 7/20	494242	-7.28111	10179.37476	-1618.43608	50.53925		-495860.4361	89178023	9443.41161	50.5392483	1347.51431
dde clp2 7/20	436699	-4.94980	9266.52067	3336.23022	47.99705		-433362.7698	77288178	8791.36951	47.9970545	1824.10485
g-BHC clp2 7/20	499678	-11.68280	10816.70555	1508.72604	48.60740		-498169.274	93721079	9680.96477	48.6074043	877.258762
SSAL3-06-2BPC	58714	2.70127	7302.99665	-10028.67169	9.38039	3.33	-68742.67169	54076530	7353.6746	9.38039347	-2712.9223

LDC #: 23665E34
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

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

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

% Recovery: SF/SS * 100 ✓

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	CP1	20.0	15.48	77	77	0
Decachlorobiphenyl	↓	↓	15.50	78	78	↓
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 #: 23665E39
SDG #: Eq Cons

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: DVG
2nd Reviewer: [illegible]

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

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

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

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration

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

MS = Matrix spike percent recovery; MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 3/4

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ng/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	17.9	17.9	0	15.6	16.0	87	87	89	89	2	2
4,4'-DDT	↓	↓	1.8	18.2	19.5	92	92	99	99	7	7
Aroclor 1260											

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

LDC #: 73665 E3a
SDG #: Sa Cruz

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

Page: 1 of 1
Reviewer: VB
2nd Reviewer: [illegible]

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

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

% Recovery = 100* (SSC-SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS 280-21544/2-A

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.6	NA	16.0	NA	96	96				
4,4'-DDT	↓	↓	17.2	↓	103	103				
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 #: 23665 E3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SVG
2nd reviewer: [illegible]

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

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

Example:

Sample I.D. #2 $Y = aX^2 + bX + c$ 4,4'-DDE

Conc. = $\frac{(58714) = 2.79X^2 + 73030X + (-10028.7)}{(\quad)}$

$X = 9.38$

final conc. = $\frac{(9.38)(10\text{ ml})}{(31.0\text{ g})(0.908)}$

$= 3.33\ \mu g/kg$

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

Note: _____

Tronox LLC Facility, PCS, Henderson, Nevada
Data Validation Reports
LDC #23665

Arsenic & Manganese

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 23, 2010

LDC Report Date: August 9, 2010

Matrix: Soil

Parameters: Arsenic & Manganese

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4859-1

Sample Identification

SA206-3.00BPC
SA206-5.00BPC
SA206-7.00BPC
SA206-9.00BPC**
SA172-2.00BPC
SA172-4.00BPC
SA172-6.00BPC**
SA172-8.00BPC
SA172-2.00BPC_FD

**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 Arsenic and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04072010-RZC (from SDG 280-2280-2) 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 was not performed for this SDG.

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 280-4859-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA172-2.00BPC and SA172-2.00BPC_FD were identified as field duplicates. No arsenic or manganese was detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA172-2.00BPC	SA172-2.00BPC_FD				
Manganese	1200	1500	22 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic & Manganese - Data Qualification Summary - SDG 280-4859-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4859-1	SA206-3.00BPC SA206-5.00BPC SA206-7.00BPC SA206-9.00BPC** SA172-2.00BPC SA172-4.00BPC SA172-6.00BPC** SA172-8.00BPC SA172-2.00BPC_FD	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 280-4859-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic & Manganese - Field Blank Data Qualification Summary - SDG 280-4859-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665B4
SDG #: 280-4859-1
Laboratory: Test America

Date: 8-2-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: ✓

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/23/10
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	↓
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	N	Not performed
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV	Field Duplicates	SW	(5,9)
XV	Field Blanks	ND SW	FB=FB04072010-RZD, FB04072010-RZC, ~~FB04062010-RZB~~ (280-2216-2) (280-2280-2) ~~(280-2131-1)~~ CR

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: ** Indicates sample underwent Stage 4 validation

Soil

1	SA206-3.00BPC ✓	11	PBS	21		31	
2	SA206-5.00BPC ✓	12		22		32	
3	SA206-7.00BPC ✓	13		23		33	
4	SA206-9.00BPC ✓**	14		24		34	
5	SA172-2.00BPC ✓	15		25		35	
6	SA172-4.00BPC ✓	16		26		36	
7	SA172-6.00BPC ✓**	17		27		37	
8	SA172-8.00BPC ✓	18		28		38	
9	SA172-2.00BPC ✓ FD	19		29		39	
10		20		30		40	

Notes:

ND - FD pairs

LDC #: 23665B4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: LA

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
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) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.			✓	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23666B4

VALIDATION FINDINGS CHECKLIST

Reviewer: eR
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			~	
Do all applicable analysies have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			~	
Were analytical spike recoveries within the 85-115% QC limits?			/	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		/		
Were all percent differences (%Ds) < 10%?			/	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
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 analytes were detected in the field duplicates.	/			
XV. Field blanks				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.	/	/		

LDC #: 23665B4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
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⁻, ____
5-9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, (Mn), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, 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-MS		Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, (Mn), Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____

Comments: Mercury by CVAA if performed

LDC#: 23665B4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

Compound	Concentration (mg/Kg) 5	9	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Manganese	1200	1500	22			

V:\FIELD DUPLICATES\FD_inorganic\23665B4.wpd

LDC #: 23665B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: CS
2nd Reviewer: [illegible]

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

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

%R = Found x 100 / True

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Mn	39.0	40.0	98	98	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV(01:25)	ICP/MS (Continuing calibration)	As	50.4	50.0	101	101	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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.

LDC #: 2366584

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

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

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

$\%R = \frac{Found}{True} \times 100$

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:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/kg	True / D / SDR ~~(units)~~ mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	104 mg/L	100 mg/L	104	104	Y
LCS	Laboratory control sample	Mn	20.1	20.0	101	100	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

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

LDC #: 23665S1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: LK

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)\left(\frac{15.77\ ug/L}{1000}\right)(5)}{(1.09g)(0.931)} = 7.8\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	As	7.8	7.8	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 24, 2010

LDC Report Date: August 9, 2010

Matrix: Soil/Water

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4864-1

Sample Identification

SSAR4-04-1.00BPC
SSAR4-04-3.00BPC
SSAR4-04-5.00BPC
SSAR4-04-7.00BPC
SSAR4-04-9.00BPC**
SSAR4-04-1.00BPC-FD
EB06242010-RZB
SSAR4-04-3.00BPCMS
SSAR4-04-3.00BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 8 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for 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.

Sample EB06242010-RZB was identified as an equipment blank. No arsenic was found in this blank.

Sample FB-04062010-RZB (from SDG 280-2131-2) was identified as a field blank. No arsenic was found in this blank.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) 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 280-4864-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAR4-04-1.00BPC and SSAR4-04-1.00BPC-FD were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAR4-04-1.00BPC	SSAR4-04-1.00BPC-FD				
Arsenic	2.5	3.3	-	0.8 (≤0.64)	J (all detects)	A

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-4864-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4864-1	SSAR4-04-1.00BPC SSAR4-04-3.00BPC SSAR4-04-5.00BPC SSAR4-04-7.00BPC SSAR4-04-9.00BPC** SSAR4-04-1.00BPC-FD EB06242010-RZB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
280-4864-1	SSAR4-04-1.00BPC SSAR4-04-1.00BPC-FD	Arsenic	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Field Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665C4
SDG #: 280-4864-1
Laboratory: Test America

Date: 8-3-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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: 6/24/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/D
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV	Field Duplicates	SW	(1,6)
XV	Field Blanks	ND	EB=7 FB= FB040620 10-RZB (280-21131-2)

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: ** Indicates sample underwent Stage 4 validation

all soil except 7 = water

1	SSAR4-04-1.00BPC	11	PBW	21		31	
2	SSAR4-04-3.00BPC	12	PBS	22		32	
3	SSAR4-04-5.00BPC	13		23		33	
4	SSAR4-04-7.00BPC	14		24		34	
5	SSAR4-04-9.00BPC**	15		25		35	
6	SSAR4-04-1.00BPC-FD	16		26		36	
7	EB06242010-RZB	17		27		37	
8	SSAR4-04-3.00BPCMS	18		28		38	
9	SSAR4-04-3.00BPCMSD	19		29		39	
10		20		30		40	

Notes: _____

LDC #: 23665C4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: LA

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
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) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23666C4

VALIDATION FINDINGS CHECKLIST

Reviewer: ak
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
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 analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC#: 23665C4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

Compound	Concentration (mg/Kg) 5	Concentration (mg/Kg) 9	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Arsenic	2.5	3.3		0.8	(≤0.64)	Jdet/A (fd)

V:\FIELD DUPLICATES\FD_inorganic\23665C4.wpd

LDC #: 23655CV

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CB
2nd Reviewer: [illegible]

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

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

%R = Found x 100 / True

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	AS	40.6	40.0	102	102	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	AS	50.1	50.0	100	100	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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.

LDC #: 23665C4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: SR
2nd Reviewer: LA

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

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

$$\%R = \frac{Found}{True} \times 100$$

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:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

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

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

$$\%D = \frac{|I-SDR|}{I} \times 100$$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	102 ug/L	100 ug/L	102	102	Y
LCS	Laboratory control sample		19.7	20.0	99	98	
8	Matrix spike		(SSR-SR) 17.6	19.2	92	92	
8D	Duplicate		20.8	22.3	7	7	
2	ICP serial dilution (09:34)	✓	3.2	3.42	6.4	7.5	↓

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.

LDC #: 236564

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)(5)\left(\frac{5.73\mu g/L}{1000}\right)}{(0.931)(1.04g)} = 3.0 mg/kg$$

#	Sample ID (2222)	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	5	As	3.0	3.0	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 29, 2010

LDC Report Date: August 9, 2010

Matrix: Soil/Water

Parameters: Arsenic

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4960-1

Sample Identification

SSAJ2-05-1BPC
SSAJ2-05-5BPC_FD
SSAJ2-05-5BPC
SSAJ2-05-10BPC**
EB-06292010-RZD
SSAJ2-05-1BPCMS
SSAJ2-05-1BPCMSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 6 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for 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.

Sample EB-06292010-RZD was identified as an equipment blank. No arsenic was found in this blank.

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) 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 280-4960-1	All analytes reported below the PQL.	J (all detects)	A

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAJ2-05-5BPC_FD and SSAJ2-05-5BPC were identified as field duplicates. No arsenic was detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ2-05-5BPC_FD	SSAJ2-05-5BPC				
Arsenic	5.5	5.2	6 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Data Qualification Summary - SDG 280-4960-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4960-1	SSAJ2-05-1BPC SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAJ2-05-10BPC** EB-06292010-RZD	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 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Equipment Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Arsenic - Field Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665E4
SDG #: 280-4960-1
Laboratory: Test America

Date: 8-3-10
Page: 1 of 1
Reviewer: QR
2nd Reviewer: W

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: 6/29/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS/D
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3)
XV	Field Blanks	ND	EB=5, FB=04072010-RZD (280-22162)

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: ** Indicates sample underwent Stage 4 validation

Soil/water

1	SSAJ2-05-1BPC S	11	PBW	21		31	
2	SSAJ2-05-5BPC_FD	12	PBS	22		32	
3	SSAJ2-05-5BPC	13		23		33	
4	SSAJ2-05-10BPC**	14		24		34	
5	EB-06292010-RZD W	15		25		35	
6	SSAJ2-05-1BPC_MS S	16		26		36	
7	SSAJ2-05-1BPC_MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: No .. inD's

LDC #: 23665E4

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
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) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
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 analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓		✓	
Target analytes were detected in the field blanks.		✓		

LDC#: 23665E4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6020/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	2	3				
Arsenic	5.5	5.2	6			

V:\FIELD DUPLICATES\FD_inorganic\23665E4.wpd

LDC #: 23665E9

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: CS
2nd Reviewer: [illegible]

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

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

%R = Found x 100 / True

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	As	40.4	40.0	101	101	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV(23:44)	ICP/MS (Continuing calibration)	As	49.9	50.0	100	100	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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.

LDC #: 23665E4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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

$$\%R = \frac{Found}{True} \times 100$$

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:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

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

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

$$\%D = \frac{|I-SDR|}{I} \times 100$$

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

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/kg	True / D / SDR ~~(units)~~ mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	As	98.6 ug/L	100 ug/L	99	99	Y
LCS	Laboratory control sample		~~40,2~~ 19.7	~~40,0~~ 20.0	99	~~100~~ 98	
6	Matrix spike		(SSR-SR) 21.6	23.6	92	93	
7	Duplicate		35.6	35.8	1	0	
5	ICP serial dilution		ND	ND	NC	NC	

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

LDC #: 23665E4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer:

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)(5)\left(\frac{9.75ug/L}{1000}\right)}{(0.916)(1.03g)} = 5.2\ mg/kg$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	As	5.2	5.2	Y

Note:

Tronox LLC Facility, PCS, Henderson, Nevada
Data Validation Reports
LDC #23665

Perchlorate

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 23, 2010

LDC Report Date: August 9, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4859-1

Sample Identification

SA179-3.00BPC
SA179-5.00BPC
SA179-7.00BPC
SA179-9.00BPC**

**Indicates sample underwent Stage 4 review

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.

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-04072010-RZD (from SDG 280-2216-2) was identified as a field blank. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All 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 280-4859-1	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 280-4859-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4859-1	SA179-3.00BPC SA179-5.00BPC SA179-7.00BPC SA179-9.00BPC**	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 280-4859-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-4859-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665B6
SDG #: 280-4859-1
Laboratory: Test America

Date: 8-2-10
Page: 1 of 1
Reviewer: QC
2nd Reviewer: W

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: 6/23/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FB-040710-RZD (280-2216-2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

Soil

1	SA179-3.00BPC.	11	PBS	21		31	
2	SA179-5.00BPC.	12		22		32	
3	SA179-7.00BPC.	13		23		33	
4	SA179-9.00BPC.**	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 #: 236586

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: VV

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
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. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

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?	✓			
VIII. Overall assessment of data				
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. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 23665B6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method 3.14.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated.Calibration date: 6/7/10

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

%R = Found X 100 / True

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

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

Type of analysis	Analyte	Standard	Conc. (~~m~~µg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1	0.00284	*0.999314*	0.999358	Y
		s2	2.5	0.0077			
		s3	5	0.0154			
		s4	10	0.03108			
		s5	20	0.06039			
		s6	40	0.13055			
Calibration verification		ICV	20	19.006	95	—	
Calibration verification		CCV	30	28.915	96	—	
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.

LDC #: 23665B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

%R = Found / True x 100 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S ~~(units)~~ mg/kg	True / D ~~(units)~~ mg/kg	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	C104	00976	0.0990	99	99	Y
N	Matrix spike sample		(SSR-SR)				
N	Duplicate sample						

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

LDC #: 23665B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [signature]

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for ClO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(Area + 0.0004)(DF)(Vol)}{(0.0032)(wt)}$

Recalculation: $\frac{(0.07486 + 0.0004)(500)(100mL)}{(0.91)(9.9g)(0.0032)} = 130529$ ug/kg

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	ClO4	130	130	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 24, 2010

LDC Report Date: August 9, 2010

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4864-1

Sample Identification

SSAR6-05-1.00BPC
SSAR6-05-3.00BPC
SSAR6-05-5.00BPC**
SSAR6-05-5.00BPC_FD
SSAR6-05-7.00BPC
SSAR6-05-9.00BPC
SSAR4-04-1.00BPC
SSAR4-04-3.00BPC
SSAR4-04-5.00BPC
SSAR4-04-7.00BPC
SSAR4-04-9.00BPC**
SSAR4-04-1.00BPC-FD
EB06242010-RZB
SSAR4-04-3.00BPCMS
SSAR4-04-3.00BPCMSD
SSAR4-04-3.00BPCDUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 15 soil samples and one water sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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 EB06242010-RZB was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB06242010-RZB	6/24/10	Perchlorate	0.49 ug/L	All soil samples in SDG 280-4864-1

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

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

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All soil samples in SDG 280-4864-1

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SSAR6-05-1.00BPC	Perchlorate	3.2 mg/Kg	3.2U mg/Kg
SSAR6-05-3.00BPC	Perchlorate	2.7 mg/Kg	2.7U mg/Kg
SSAR6-05-5.00BPC**	Perchlorate	3.6 mg/Kg	3.6U mg/Kg
SSAR6-05-5.00BPC_FD	Perchlorate	3.4 mg/Kg	3.4U mg/Kg
SSAR6-05-7.00BPC	Perchlorate	2.8 mg/Kg	2.8U mg/Kg
SSAR6-05-9.00BPC	Perchlorate	3.4 mg/Kg	3.4U mg/Kg

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 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 280-4864-1	All analytes reported below the PQL.	J (all detects)	A

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples SSAR6-05-5.00BPC** and SSAR6-05-5.00BPC_FD and samples SSAR4-04-1.00BPC and SSAR4-04-1.00BPC-FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAR6-05-5.00BPC**	SSAR6-05-5.00BPC_FD				
Perchlorate	3.6	3.4	6 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAR4-04-1.00BPC	SSAR4-04-1.00BPC-FD				
Perchlorate	850	1100	26 (≤50)	-	-	-

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Data Qualification Summary - SDG 280-4864-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4864-1	SSAR6-05-1.00BPC SSAR6-05-3.00BPC SSAR6-05-5.00BPC** SSAR6-05-5.00BPC_FD SSAR6-05-7.00BPC SSAR6-05-9.00BPC SSAR4-04-1.00BPC SSAR4-04-3.00BPC SSAR4-04-5.00BPC SSAR4-04-7.00BPC SSAR4-04-9.00BPC** SSAR4-04-1.00BPC-FD EB06242010-RZB	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 280-4864-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-4864-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-4864-1

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
280-4864-1	SSAR6-05-1.00BPC	Perchlorate	3.2U mg/Kg	A	bf
280-4864-1	SSAR6-05-3.00BPC	Perchlorate	2.7U mg/Kg	A	bf
280-4864-1	SSAR6-05-5.00BPC**	Perchlorate	3.6U mg/Kg	A	bf
280-4864-1	SSAR6-05-5.00BPC_FD	Perchlorate	3.4U mg/Kg	A	bf
280-4864-1	SSAR6-05-7.00BPC	Perchlorate	2.8U mg/Kg	A	bf
280-4864-1	SSAR6-05-9.00BPC	Perchlorate	3.4U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665C6
SDG #: 280-4864-~~1~~
Laboratory: Test America

Date: 8-3-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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: 6/24/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(3,4), (7,12)
X.	Field blanks	SW	EB=13, FB= ~~FB04072010-RZ~~ FB040620 10-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: ** Indicates sample underwent Stage 4 validation

all soil except FB = water

1	SSAR6-05-1.00BPC	11	SSAR4-04-9.00BPC**	21	PBW	31	
2	SSAR6-05-3.00BPC	12	SSAR4-04-1.00BPC-FD	22	PBS	32	
3	SSAR6-05-5.00BPC**	13	EB06242010-RZB	23		33	
4	SSAR6-05-5.00BPC_FD	14	SSAR4-04-3.00BPCMS	24		34	
5	SSAR6-05-7.00BPC	15	SSAR4-04-3.00BPCMSD	25		35	
6	SSAR6-05-9.00BPC	16	SSAR4-04-3.00BPCDUP	26		36	
7	SSAR4-04-1.00BPC	17		27		37	
8	SSAR4-04-3.00BPC	18		28		38	
9	SSAR4-04-5.00BPC	19		29		39	
10	SSAR4-04-7.00BPC	20		30		40	

Notes:

LDC #: 23665C6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
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. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

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?	✓			
VIII. Overall assessment of data				
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. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 23665C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

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

Blank units: ug/L **Associated sample units: mg/Kg** Reason Code: be

Sampling date: 6/24/10 Soil factor applied 10x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification							
	13		No Qualifiers							
ClO4	0.49	0.049								

LDC #: 23665C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: QR
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

(Y) N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf

Sampling date: 4/6/10 Soil factor applied 10x

Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification							
	FB04062010-RZB (SDG#: 280-2131-13)		~~No Qualifiers~~	1	2	3	4	5	6	
ClO4	92	9.2		3.2	2.7	3.6	3.4	2.8	3.4	

LDC#: 23665C6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CL
2nd Reviewer: [illegible]

Inorganics, Method: See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	3	4				
Perchlorate	3.6	3.4	6			

V:\FIELD DUPLICATES\FD_inorganic\23665C6.wpd

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	7	12				
Perchlorate	850	1100	26			

LDC #: 23665C6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: CR
2nd Reviewer: [signature]

Method: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated.Calibration date: 6/7/10

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

%R = Found X 100 / True

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

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

Type of analysis	Analyte	Standard	Conc. (µg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1	0.00284	*0.999314*	0.999358	Y
		s2	2.5	0.0077			
		s3	5	0.0154			
		s4	10	0.03108			
		s5	20	0.06039			
		s6	40	0.13055			
Calibration verification		ICV	20	19.006	95	—	
Calibration verification		CCV	30	28.915	96	—	
Calibration verification		↓	10	9.621	96	—	↓

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.

LDC #: 23665C6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: L

METHOD: Inorganics, Method See cover

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

%R = Found / True x 100 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Clay	0.0976	0.0990	99	99	Y
14	Matrix spike sample	↓	(SSR-SR) 526	538	98	100	↓
16	Duplicate sample	↓	1027	992	4	4	↓

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

LDC #: 23665C6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for ClO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(Area+0.0004)(DF)(Vol)}{(0.0032)(Wt)(\%\ Solid)}$

Recalculation: $\frac{(0.10486+0.0004)(10)(100mL)}{(0.92)(0.0032)(10g)} = 3575\ ug/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	3	ClO4	3.6	3.6	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 24, 2010

LDC Report Date: August 9, 2010

Matrix: Soil

Parameters: Perchlorate

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4864-3

Sample Identification

SSAR4-04-10.00BPC
SSAR4-04-10.00BPCMS
SSAR4-04-10.00BPCMSD
SSAR4-04-10.00BPCDUP

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.

Sample EB06242010-RZB (from SDG 280-4864-1) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB06242010-RZB	6/24/10	Perchlorate	0.49 ug/L	All samples in SDG 280-4864-3

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

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

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB04062010-RZB	4/6/10	Perchlorate	92 ug/L	All samples in SDG 280-4864-3

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) 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 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 280-4864-3	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 280-4864-3

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4864-3	SSAR4-04-10.00BPC	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 280-4864-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-4864-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-4864-3

No Sample Data Qualified in this SDG

LDC #: 23665D6
SDG #: 280-4864-3
Laboratory: Test America

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

Date: 8-3-10
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

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: 6/24/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII	Sample result verification	A	~~Not reviewed for Stage 2B validation.~~
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	SW	EB = EB06242010-RZB (280-4864-1), FB = FB04062010-RZB (280-2131-782)

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

1	SSAR4-04-10.00BPC	11	BBS	21		31	
2	SSAR4-04-10.00BPCMS	12		22		32	
3	SSAR4-04-10.00BPCMSD	13		23		33	
4	SSAR4-04-10.00BPCDUP	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 #: 23665D6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: V

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
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. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 23665D6

VALIDATION FINDINGS CHECKLIST

Reviewer: 2R
2nd Reviewer: N

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?	✓			
VIII. Overall assessment of data				
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. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 23665D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

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

Blank units: ug/L **Associated sample units: mg/Kg** Reason Code: be

Sampling date: 6/24/10 Soil factor applied 10x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB06242010-RZB (280-4864-1)		No Qualifiers							
ClO4	0.49	0.049								

LDC #: 23665D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover

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

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 4/6/10 Soil factor applied 10x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	FB04062010-RZB (SDG#: 280-2131-73)									
ClO4	92	9.2								

LDC #: 23665D6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: QR
2nd Reviewer: L

Method: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated.Calibration date: 6/7/10

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

%R = Found X 100 / True Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

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

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1	0.00284	*0.999314*	0.999358	Y
		s2	2.5	0.0077			
		s3	5	0.0154			
		s4	10	0.03108			
		s5	20	0.06039			
		s6	40	0.13055			
Calibration verification		ICV	20	19.006	95	—	
Calibration verification		CCV	30	32.356	108	—	
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.

LDC #: 23665DS

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

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

%R = Found / True x 100 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl04	0.103	0.0990	104	104	Y
2	Matrix spike sample	"	(SSR-SR) 4019	529	94	94	"
4	Duplicate sample	"	1088	1194	9	9	"

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

LDC #: 23665D6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer:

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for _____ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(Area + 0.0004)(\text{Total Vol})(DF)}{(0.0032)(Wt)(\%\,Solid)(1000)}$

Recalculation: $\frac{(0.07176 + 0.0004)(100\,mL)(5000)}{(0.935)(0.0032)(10.1\,g)(1000)} = 1194\ mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	ClO4	1200	1200	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 29, 2010

LDC Report Date: August 9, 2010

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-4960-1

Sample Identification

SSAJ2-05-1BPC
SSAJ2-05-5BPC_FD
SSAJ2-05-5BPC
SSAJ2-05-10BPC**
EB-06292010-RZD
SSAJ2-05-1BPCMS
SSAJ2-05-1BPCMSD
SSAJ2-05-1BPCDUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 soil samples and one water sample listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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 EB-06292010-RZD was identified as an equipment blank. No perchlorate was found in this blank.

Sample FB-04072010-RZD (from SDG 280-2216-2) 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) 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
SSAJ2-05-1BPCMS/MSD (All soil samples in SDG 280-4960-1)	Perchlorate	1 (75-125)	2 (75-125)	-	J- (all detects) R (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

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

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-4960-1	All analytes reported below the PQL.	J (all detects)	A

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples SSAJ2-05-5BPC_FD and SSAJ2-05-5BPC were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SSAJ2-05-5BPC_FD	SSAJ2-05-5BPC				
Perchlorate	3.4	7.2	72 (≤50)	-	J (all detects)	A

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Data Qualification Summary - SDG 280-4960-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-4960-1	SSAJ2-05-1BPC SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAJ2-05-10BPC**	Perchlorate	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
280-4960-1	SSAJ2-05-1BPC SSAJ2-05-5BPC_FD SSAJ2-05-5BPC SSAJ2-05-10BPC** EB-06292010-RZD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
280-4960-1	SSAJ2-05-5BPC_FD SSAJ2-05-5BPC	Perchlorate	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada
Perchlorate - Field Blank Data Qualification Summary - SDG 280-4960-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 23665E6
SDG #: 280-4960-1
Laboratory: Test America

Date: 8-3-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

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: 6/29/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(2,3)
X	Field blanks	ND	EB=5, FB=FB-04072010-RZD (280-2216-2)

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

Validated Samples: ** Indicates sample underwent Stage 4 validation

(water/soil)

1	SSAJ2-05-1BPC S	11	PBSW	21		31	
2	SSAJ2-05-5BPC FD	12	PBS	22		32	
3	SSAJ2-05-5BPC	13		23		33	
4	SSAJ2-05-10BPC**	14		24		34	
5	EB-06292010-RZD W	15		25		35	
6	SSAJ2-05-1BPCMS S	16		26		36	
7	SSAJ2-05-1BPCMSD	17		27		37	
8	SSAJ2-05-1BPCDUP	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Keep Samples

NO MS/D Pending

LDC #: 23666E6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
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. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

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?	✓			
VIII. Overall assessment of data				
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. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 23665S6
SDG #: —

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 314.0

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

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

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	6/7	Soil	ClO4	1	2		All Soil	J-/R/A (m)

Comments: _____

MSD.6

LDC#: 23665E6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: ~

Inorganics, Method: See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	2	3				
Perchlorate	3.4	7.2	72			Jdet/A (fd)

V:\FIELD DUPLICATES\FD_inorganic\23665E6.wpd

LDC #: 23665S6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: QR
2nd Reviewer: M

Method: Inorganics, Method 314.0

The correlation coefficient (r) for the calibration of ClO4 was recalculated.Calibration date: 6/7/10

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

%R = Found X 100 / True

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

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

Type of analysis	Analyte	Standard	Conc. (~~m~~g/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	1	0.00284	*0.999314*	0.999358	Y
		s2	2.5	0.0077			
		s3	5	0.0154			
		s4	10	0.03108			
		s5	20	0.06039			
		s6	40	0.13055			
Calibration verification		ICV	20.0	19.006		95	
Calibration verification		CCV	30	30.544		102	
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.

LDC #: 23665E5

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: W

METHOD: Inorganics, Method See cover

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

%R = Found / True x 100 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (~~units~~) mg/kg	True / D (~~units~~) mg/kg	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO4	0.0874	0.101	87	87	Y
6	Matrix spike sample	↓	(SSR-SR) 123	62.0	0	1	↓
8	Duplicate sample	↓	123	123	0	0	↓

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

LDC #: 23665E6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: h

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for ClO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(Area + 0.0004)(DF)(Vol)}{(Slope)(\%\ Solid)(Wt)(1000)}$

Recalculation: $\frac{(0.0514 + 0.0004)(20)(100\ mL)}{(0.916)(0.0032)(10\ g)(1000)} = 3.7\ mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	ClO4	3.7	3.7	Y

Note: