

LABORATORY DATA CONSULTANTS, INC.

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Northgate Environmental Management, Inc.

August 17, 2010

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

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

Data Validation

Dear Ms. Arnold,

Enclosed are the final validation reports for the 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#	<u>Fraction</u>
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,

Erlinda T. Rauto

Operations Manager/Senior Chemist

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

Semivolatiles



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

SA82-0.00BPCMSD

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

^{**}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 RSAO3-0.00BPC RSAK5-01-0.00BPC RSAK5-01-0.00BPC RSAK8-0.00BPC

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) 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)	Р

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)	Α

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 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:

	Concentrat	ion (ug/Kg)	RPD	Difference		
Compound	RSAK8-0.00BPC	RSAK8-0.00BPC_FD	(Limits)	(Limits)	Flags	A or P
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)	Р	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 SSAK3-01-0.00BPC SA70-0.00BPC SA70-0.00BPC SA70-0.00BPC SA70-0.00BPC SA70-0.00BPC RSA03-0.00BPC SA68-0.00BPC RSAC3-0.00BPC RSAC3-0.00BPC RSAC3-0.00BPC RSAC3-0.00BPC RSAC3-0.00BPC RSAK5-01-0.00BPC RSAK8-0.00BPC RSAK8-0.00BPC	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 280-4735-1

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

	Date:	8/10/10
	Page:_	1 of
	Reviewer:	N
2nd	Reviewer.	

Laboratory: Test America

LDC #: 23665A2a

SDG #: 280-4735-1

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/21/10
11.	GC/MS Instrument performance check	A	,
111.	Initial calibration	Á	2 RSD r
IV.	Continuing calibration/ICV	A	2 RSD ~ CW/W = 25 }
V.	Blanks	A	,
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	Ą	us
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	Ą	
XI.	Target compound identification	4	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	Å	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	·
XVI	Field duplicates	SW	D = 5, 19
XVII.	Field blanks	W2	FB = FB04062010-RZB (from 280-2131-2)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected FB - 0 467 = Duplicate
R = Rinsate
TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

** Indicates sample underwent Stage 4 validation

		105					
† 1 1	SA33-0.00BPC	+ 7 11	SA82-0.00BPC**	21	SA82-0.00BPCMSD	- 1	MB 280 - 2055 2/1-A
2 1	SSAN6-06-0.00BPC	12	SSAK4-01-0.00BPC	22		32	MB 200- 21723/1-A
3 1	SA200-0.00BPC	13	SA70-0.00BPC	23		33	
- 1	RSAL8-0.00BPC	† 1 14	SA167-0.00BPC	24		34	
† 1	RSAK8-0.00BPC	≯ ₹ 15	RSAO3-0.00BPC	25		35	
6	SSAK8-02-0.00BPC	1 ₆ !	SA68-0.00BPC	26		36	·
+ 1	SSAK6-01-0.00BPC	- 17	SSAK5-01-0.00BPC	27		37	,
+ 2	SA198-0.00BPC	18	SA75-0.00BPC	28		38	
+ 1 9	RSAH3-0.00BPC	† (RSAK8-0.00BPC_FD 0	29		39	
10 1	SSAK3-01-0.00BPC	20	SA82-0.00BPCMS	30		40	

LDC #: 23 66 Aza SDG #: Sie Cover

VALIDATION FINDINGS CHECKLIST

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

Method: Semivolatiles (EPA SW 846 Method 8270C)

method: Semivolatiles (EPA SW 646 Method 6270C)				= 10
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.	C. Co. in Charles			
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				Section 1985 - Sectio
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				Application of the Development of the Control of th
Was a method blank associated with every sample in this SDG?		ļ	ļ	
Was a method blank analyzed for each matrix and concentration?	-			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?		/		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?		/		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			_	
VII. Matrix spike/Matrix spike duplicates				en vilve
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.	/	<u> </u>		
Was a MS/MSD analyzed every 20 samples of each matrix?	/	<u> </u>	<u> </u>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples	15 1 15 1			
Was an LCS analyzed for this SDG?	<u> </u>			

LDC #: 27665 Aza SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: \mathcal{N}_{ℓ} 2nd Reviewer: \mathcal{N}_{ℓ}

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?				
PX. 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?				Security of the Security of t
XI. Target compound identification	T 7			
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?				man says
XII. Compound quantitation/CROLs				
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)			4	
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/		
XIV. System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates				Principal Control of the Control of
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.				
XVII. Field blanks	1			
Field blanks were identified in this SDG.	1			
Target compounds were detected in the field blanks.		<u> </u>		

VALIDATION FINDINGS WORKSHEET

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

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

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

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Reviewer: 2nd Reviewer:

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

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

Were target compounds detected in the field blanks?

Blank units: MO / L Associated sample units: NG / KK

Sampling date: 7 16 c 1/10

(M)						
1, 16	tion					
	Sample Identification					
Associated Samples:	S					
ther:						
/ Rinsate / C		0-RZB				
Field Blan	Blank ID	FB 04662010-RZB	2.7			
ield blank type: (circle one) Field Blank / Rinsate / Other	Compound		EEE			
ield						CRO

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

Sampling date: 4 47 /to

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

17 18 9-15 1 4 Associated Samples:

Compound	Blank ID					Sampl	Sample Identification	ation				
	FB-046720M-RZD	910-RZD										
449	2.2		Resu	Results einer ND	N 7	[Q]	α >	> 6x FB	(4=			
			,						_			
					· · · · · · · · · · · · · · · · · · ·						W	
					,							
CRQL												

5x Phthalates 2x All others

73665 Aza LDC#:

VALIDATION FINDINGS WORKSHEET

Page: of /

Reviewer:_ 2nd Reviewer:

Surrogate Recovery

Please see qualification below for all questions answered "N". Not applicable questions are identified as "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? If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

	(my 1 my)				∀																				
Qualifications	No just (m	•			₹																				QC Limits (Water) 21-100 10-123 33-110*
its)	(51-120)	()	<u> </u>	()	(,	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	QC Limits (Soil) 25-121 19-122 20-130*
%R (Limits)	37		λ		4																				S5 (2FP)= 2-Fluorophenol S6 (TBP) = 2,4,6-Tribromophenol S7 (2CP) = 2-Chlorophenol-d4 S8 (DCB) = 1,2-Dichlorobenzene-d4
Surrogate	TBP				-																				
Sample ID																									oil) QC Limits (Water) 35-114 43-116 33-141 10-94
Sarr	9		11		5/																				QC Limits (Soil) d5 23-120 nyl 30-115 t 18-137 24-113
Date																									* QC limits are advisory S1 (NBZ) = Nitrobenzene-d5 S2 (FBP) = 2-Fluorobipheny S3 (TPH) = Terpheny-d14 S4 (PHL) = Phenol-d5
*																									* QC limi S1 (NBZ) S2 (FBP) S3 (TPH) S4 (PHL)

(S)

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23665	7
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20	SDG

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

Page: ___of__ Reviewer:

2nd Reviewer:

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

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

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

	Semple ID	Finding	Associated Samples	Qualifications
. 6		GGG HHH proper unresolved	imsolved	JMJ/P (9)
•				, , ,

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23665A2a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: Reviewer: 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?

Commound Name	Conc (ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	5	19	(≤50%)	DIII	,	(Parent Only)
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	

V:\FIELD DUPLICATES\23665A2a.wpd

LDC#: 23665 420

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: of / 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:

 $RRF = (A_x)(C_s)/(A_{ts})(C_x)$

A_x = Area of Compound
C_x = Concentration of compound,
C= Standard doubtion of the DDE

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

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

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

			Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
	Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
Standard ID	Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)		
ICAL	7/3/2010	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

Area IS	211425	807956	462977	764720	816792	802029
Area cpd	161271	1052210	720125	226817	1110735	1134417
nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20

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	6009.0	0.9839	1.2100	0.2228	1.0410	1.0984
120.00	2069'0	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	0825.0	0.8135	1.0545	0.2020	0.9308	0.9884
×	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 K 2a

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page / of / Reviewer:_ 2nd Reviewer:

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

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

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

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

ave. RRF = initial calibration average RRF

Ax = Area of compound

RRF = continuing calibration RRF

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

Recalculated 0.5 €. 1.0 3.0 0.0 Reported 1.0 3.0 0.5 0.0 Recalculated (CC RRF) 0.5928 1.1658 0.2226 1.0548 1.0759 0.9811 (CC RRF) Reported 0.5928 1.1658 0.2226 1.0548 1.0759 Average RRF (Initial RRF) 0.6008 0.9914 1.2017 1.0549 0.2237 1.0538 (183) (IS1) (184) (185) (186) Compound (Reference IS) Hexachlorobenzene Dimethyl phthalate Benzo(a)pyrene Naphthalene 1,4-Dioxane Chrysene Calibration 01//0//10 Standard ID K4878 N #

		CCV1		CCV2		
Compound (Reference IS)	(9	Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	241225	203461		
Naphthalene	(182)	40/80	1558552	794306		
Dimethyl phthalate	(183)	40/80	1092058	468367		
Hexachlorobenzene	(184)	40/80	343831	772369		
Chrysene	(185)	40/80	1750464	829765		
Benzo(a)pyrene	(186)	40/80	1814453	843187		

LDC#: 73665 Azq SDG#: Ste Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	12	81.6	82	62	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	1	18.4	ĺγ	17	X
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID.

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

Sample ID:

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

LDC#: 8366FAVA SDG #: See Cover

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	nd Dowiewer
	-	700

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

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

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

Where:

SC = Sample concentation

SSC = Spiked sample concentration SA = Spike added

MSDC = Matrix spike duplicate concentration

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

MSC = Matrix spike concentration

12 MS/MSD samples: _

	Spi	Ke	Sample	Spiked (Sample	Matrix Spike	Spike	Matrix Spike Duplicate	• Duplicate	MS/MSD	SD
Compound	Added (12/ 24)	18d ()	Concentration ($M \leq /C$)	Concentration (12 /c-1)	tration	Percent Recovery	ecovery	Percent Recovery	есочегу	RPD	
	MS	O MSD	0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2620	2092	٥	2140	2140 空部准6	8>	82	84	<i>k</i> %	1	
Pentachlorophenol	•										
Pyrene	2620	2600	0	2240	2320 2320	85	58	89	89	۶	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 # 23665 Arg SDG #: See Corer

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

Reviewer:_

Page: lof l 2nd Reviewer:_

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

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

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

LCS 280-21723

	Sb	ike	S	ike	31	cs	ä	CSD	I CS/I	CS/I CSD
Compound	Added (1/6 / 1/6)	ded /c)	Concei (MC	Concentration (⋈∠ /[ح)	Percent Recovery	{ecovery	Percent Recovery	Recovery	RPD	ď
	SUI) I CSD	1.05	I CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2590	\$	2440	NA	94	9 4				
Pentachlorophenol		-								
Pyrene	2590		2092	7	Laj	191				

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 #: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	lof1_
Reviewer:_	M6
2nd reviewer:	∇

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

(Y)	N	N/A
\sqrt{y}	N	N/A

%S

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

Example: Concentration = $(A_{\bullet})(I_{\bullet})(V_{\bullet})(DF)(2.0)$ $(A_{is})(RRF)(V_o)(V_i)(\%S)$ Sample I.D. # 11 , 55 : Area of the characteristic ion (EICP) for the compound Area of the characteristic ion (EICP) for the specific internal standard Conc. = $\frac{(175430)(40.0)(1.6m)(100)(100)}{(914622)(0.2237)(30.62)(0.986)}$ Amount of internal standard added in nanograms (ng) = Volume or weight of sample extract in milliliters (ml) or = ٧。 grams (g). Volume of extract injected in microliters (ul) Volume of the concentrated extract in microliters (ul) = ~ 1200 mg kg Dilution Factor. Df

Percent solids, applicable to soil and solid matrices only.

2.0	= Factor of 2 to accoun	t for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
			 the state of the s		
	<u> </u>		 <u>-</u>		

			***************************************	· · · · · · · · · · · · · · · · · · ·	

					l

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 2B/4

LDC #:	23665B2a	VALIDATION COMPLET
SDG #:	280-4859-1	Stage 2
Laborato	ry: Test America	

2nd Reviewer:

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

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

	Validation Area		Comments
I,	Technical holding times	A	Sampling dates: 6/23/18
11.	GC/MS Instrument performance check	Α	·
111.	Initial calibration	A	2 RSD rr
IV.	Continuing calibration/ICV	A	ca/10 625 %
V.	Blanks	A	·
VI.	Surrogate spikes	Á	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	Client Spec
IX.	Regional Quality Assurance and Quality Control	N	·
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	Á	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	SSA03-02-5.00BPC	11	MB 280 - 21097 /-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 #: 23 665 \$76 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 300
2nd Reviewer: 500

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)	<u> </u>			
Validation Area	Yes	No	NA	Findings/Comments
L Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.		(35)XS (25)		
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?		30/4165-AUROS	Na Santa	
III. Initial calibration				The Committee of the Co
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				A Commence of the Commence of
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?				
trian an edg dilanteed for this object.				

LDC #: 27665 Bra SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 300 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?	X1. 272 #			New York Control of the Control of t
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				Fig. 1. The second of the seco
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?	1	,		
XIII. Tentatively identified compounds (TICs)				E Severille 17 To the second
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance				
System performance was found to be acceptable.				
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XVI: Field duplicates				16 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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#: 23665 Ban

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of Reviewer:

2nd Reviewer:

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

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

average RRF = sum of the RRFs/number of standards $RRF = (A_x)(C_{is})/(A_{is})(C_x)$

%RSD = 100 * (S/X)

 C_x = Concentration of compound, A_x = Area of Compound

 $A_{ls} = \mbox{Area of associated internal standard} \\ C_{ls} = \mbox{Concentration of internal standard} \\$

S= Standard deviation of the RRFs,

X = Mean of the RRFs

# Calibration Compound (Internal Standard) (50 std) (50 std) (1nitial) (Initial) (Initial)						Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
Standard ID Date Compound (Internal Standard) (50 std) (50 std) (Initial) ICAL 7/3/2010 1,4-Dioxane (IS1) 0.6102 0.6102 0.6008 MSS K Naphthalene (IS2) 1.0418 1.0418 0.9914 Pimethyl phthalate (IS3) 1.2443 1.2443 1.2017 Hexachlorobenzene (IS4) 0.2373 0.2337 0.2237 Chrysene (IS5) 1.0879 1.0549 1.0549 Benzo(a)pyrene (IS6) 1.1315 1.1315 1.0538		y.	Calibration		• .	RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
7/3/2010 1,4-Dioxane (IS1) 0.6102 0.6102 0.6008 Naphthalene (IS2) 1.0418 1.0418 0.9914 Dimethyl phthalate (IS3) 1.2443 1.2017 Hexachlorobenzene (IS4) 0.2373 0.2373 Chrysene (IS5) 1.0879 1.0549 Benzo(a)pyrene (IS6) 1.1315 1.1315	#	Standard ID			ard)	(50 std)	(50 std)	(Initial)	(Initial)		
Naphthalene (IS2) 1.0418 1.0418 0.9914 Dimethyl phthalate (IS3) 1.2443 1.2443 1.2017 Hexachlorobenzene (IS4) 0.2373 0.2237 Chrysene (IS5) 1.0879 1.0549 Benzo(a)pyrene (IS6) 1.1315 1.1315 1.0538	1	ICAL	7/3/2010		181)	0.6102	0.6102	0.6008	0.6008	5.1	5.07
iate (IS3) 1.2443 1.2443 1.2017 zene (IS4) 0.2373 0.2373 0.2237 (IS5) 1.0879 1.0549 3 (IS6) 1.1315 1.1315 1.0538		MSSK	-		182)	1.0418	1.0418	0.9914	0.9914	12.0	11.97
zene (IS4) 0.2373 0.2237 0.2237 (IS5) 1.0879 1.0879 1.0549				ate	183)	1.2443	1.2443	1.2017	1.2017	7.9	7.86
(ISG) 1.0879 1.0879 1.0549 (ISG) 1.1315 1.0538				zene	184)	0.2373	0.2373	0.2237	0.2237	7.1	7.08
e (IS6) 1.1315 1.1315 1.0538					(22)	1.0879	1.0879	1.0549	1.0549	8.8	8.79
				0.1	(98	1.1315	1.1315	1.0538	1.0538	5.1	5.09

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

764720

226817

40/20

462977

720125

40/20

816792

1110735

40/20 40/50

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1052210

40/20

211425

161271

40/20

Area IS

Area cpd

nc IS/Cpd

802029

1134417

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

Continuing Calibration Results Verification **VALIDATION FINDINGS WORSHEET**

Page _ of__ Reviewer: 2nd Reviewer:__

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

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

Where:

ave. RRF = initial calibration average RRF

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

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

RRF = continuing calibration RRF

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

Cis = Concentration of internal standard Cx = Concentration of compound

		Calibration			Average RRF	Reported	Recalculated	Reported	Recalculated
Standard ID	ā	Date	Compound (Reference IS)		(Initial RRF)	(CC RRF)	(CC RRF)	%D	Д%
K5(K5006	07/10/10	1,4-Dioxane	(IS1)	0.6008	0.5672	0.5672	5.6	5.6
				(182)	0.9914	0.9726	0.9726	1.9	1.9
			ıalate	(183)	1.2017	1.1819	1.1819	1.6	1.6
			n	(184)	0.2237	0.2268	0.2268	1.3	1.4
			Chrysene (1S	(185)	1.0549	1.0331	1.0331	2.1	2.1
			Benzo(a)pyrene (IS	(981)	1.0538	1.0875	1.0875	3.2	3.2

	Area Cpd . Area IS						
CCV2	Area IS	237424	918899	540703	893628	925248	907080
	Area Cpd	269321	1787366	1278154	405264	1911760	1972985
CCV1	Concentration (IS/Cpd)	40/80	40/80	40/80	40/80	40/80	40/80
-	(S)	(181)	(182)	(183)	(184)	(185)	(981)
	Compound (Reference IS)	1,4-Dioxane	Naphthalene	Dimethyl phthalate	Hexachlorobenzene	Chrysene	Benzo(a)pyrene

LDC #: 19665 \$ 29 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:	<u>lof_1</u>
Reviewer:_	JVL
2nd reviewer:	\sim

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: # 3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	79.4	79	79	2
2-Fluorobiphenyl		81-7	82	8 7	
Terphenyl-d14		88, 0	88	88	
Phenol-d5	150	122.6	82	87	
2-Fluorophenol		119,1	79	71	
2,4,6-Tribromophenol		129.3	86	86	X
2-Chlorophenol-d4					

1,2-Dichlorobenzene-d4

	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 #: 23 66 & 3 29 SDG #: See Cover

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

Reviewer:_

Page: lof 1 2nd Reviewer:_

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

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the

compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

LC 20-21097/2-4

	o'S.	r.	as.	ik e	SDI	S	ä	CSD	ISD I	I CS/I CSD
Compound	Added (A)	- Vag	Concer (h.d.)	Concentration (トルター)	Percent Recovery	ecovery	Percent Recovery	Recovery	R	RPD
	SS	l CSD	SD I	() I GSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	26.30	KA	1910	K-X	K	75				\
Pentachlorophenol	2									
Рутепе	2620		220		77	22				
							(

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#: 73665 BYA SDG#: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u>lot_1</u>
Reviewer:_	TV6
2nd reviewer:	N

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

Υ	N,	N/A
Υ	N	N/A
		マン

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

~			•						
Concen	tration	= $(A_{s})(I_{s})(V_{s})(DF)(2.0)$ $(A_{s})(RRF)(V_{o})(V_{s})(%S)$	Example:		La	L			
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D.		M	Ď			
A_is	=	Area of the characteristic ion (EICP) for the specific internal standard							
l _s	=	Amount of internal standard added in nanograms (ng)	Conc. = (()()()()(_)()
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).							
V,	=	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	t for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
		AND THE PROPERTY OF THE PROPER			
		AMM and the second			

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 SSAJ8-01-8.00BPC SSAK8-03-10BPC SSAJ8-01-9.00BPC SSAK8-03-15BPC** EB06242010-RZD SSAK8-03-15BBPC FD EB06242010-RZB SSAJ8-02-5BPC SSAR4-04-3.00BPCMS SSAJ8-02-10BPC SSAR4-04-3.00BPCMSD SSAJ8-02-15BPC** SSAJ8-01-7.00BPCMS EB-06252010-RZD SSAJ8-01-7.00BPCMSD SSAR3-01-2.00BPC

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 SSAR4-04-1.00BPC-FD SSAJ8-01-6.00BPC SSAJ8-01-6.00BPC FD

SSAJ8-01-7.00BPC

^{**}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	Reported	Modified Final
	TIC (RT in minutes)	Concentration	Concentration
EB06242010-RZB	242010-RZB Di-n-octylphthalate		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 Benzo(a)pyrene Benzo(g,h,i)perylene Benzo(k)fluoranthene Bis(2-ethylhexyl)phthalate Chrysene Dibenz(a,h)anthracene Di-n-octylphthalate	0.55 ug/L 0.39 ug/L 0.52 ug/L 0.61 ug/L 0.67 ug/L 0.73 ug/L 0.67 ug/L 1.8 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

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** SSAK8-03-15BPC_FD SSAJ8-02-5BPC SSAJ8-02-10BPC SSAJ8-02-15BPC** SSAJ8-01-6.00BPC SSAJ8-01-6.00BPC SSAJ8-01-7.00BPC SSAJ8-01-9.00BPC 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)	А

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 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:

	Concentral	ion (ug/Kg)				A or P	
Compound	SSAJ8-01-6.00BPC	SSAJ8-01-6.00BPC_FD	RPD (Limits)	Difference (Limits)	Flags		
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** SSAK8-03-15BPC_FD SSAJ8-02-15BPC SSAJ8-02-10BPC 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 SSAR4-04-7.00BPC SSAR4-04-7.00BPC SSAR4-04-1.00BPC-FD SSAJ8-01-6.00BPC_FD SSAJ8-01-6.00BPC SSAJ8-01-7.00BPC SSAJ8-01-9.00BPC SSAJ8-01-9.00BPC SSAJ8-01-9.00BPC 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

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

Laboratory: Test America

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24 - 25/10
11.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	A	ca/10/5257
V.	Blanks	SW	·
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
/111.	Laboratory control samples	Α	us b
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	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.
(IV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	*
(VI.	Field duplicates	SW)	$D_{\nu}^{7} = 3.4$ $D_{\nu}^{7} = 12.17$ $D_{3} = 18.19$
VII.	Field blanks	Sn)	EB = \$ 23 24 FB = FB04062010- RZB (from]

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

	3.11 7		ager .		· · · · · · · · · · · · · · · · · · ·			
+ ?	SSAK8-03-5BPC	11	SSAR3-01-4.00BPC**	21	SSAJ8-01-8.00BPC	Ş	1 1	MB 280-21081/1-A
2	SSAK8-03-10BPC	12	SSAR4-04-1.00BPC	* 7 22	SSAJ8-01-9.00BPC		_ > ,32	MB 280-21/10/1-A
3 3	SSAK8-03-15BPC** P	13	SSAR4-04-3.00BPC	23	EB06242010-RZD	V	_ 3	MB 280-21097/-,
4	SSAK8-03-15BBPC_FD D	14	SSAR4-04-5.00BPC	 24	EB06242010-RZB		34	,
– 3	SSAJ8-02-5BPC	15	SSAR4-04-7.00BPC	25	SSAR4-04-3.00BPCMS	S	35	
_ 3	SSAJ8-02-10BPC	16	SSAR4-04-9.00BPC**	26	SSAR4-04-3.00BPCMSD		36	
7	SSAJ8-02-15BPC**	17	SSAR4-04-1.00BPC-FD 1/	27	SSAJ8-01-7.00BPCMS		37	
- I	EB-06252010-RZD W	18	SSAJ8-01-6.00BPC P3	28	SSAJ8-01-7.00BPCMSD		38	
† 3	SSAR3-01-2.00BPC \$	t ₉	SSAJ8-01-6.00BPC_FD	29			39	
10	SSAR3-01-3.00BPC	20	SSAJ8-01-7.00BPC	30	Į ,		40	

LDC #:	23665	Cza
SDG #:	See Car	e(

VALIDATION FINDINGS CHECKLIST

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 646 Method 6270C)	Γ.		Ī	F:
Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times				and the second s
All technical holding times were met.	_			
Cooler temperature criteria was met.			*********	
II. GC/MS instrument performance check			I	
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?	1			
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				A 1880 a second of the second
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. Bianks				7. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
Was a method blank associated with every sample in this SDG?		ļ		
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/	V		
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?	/		ļ	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	1			
VIII Laboratory control samples		I	1000	Property of the second
Was an LCS analyzed for this SDG?		<u> </u>	<u> </u>	

LDC #: 3665 (2a SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1/1/
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?				
X. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?	0.038/0			
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				The second secon
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)				the state of the s
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			_	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			_	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/	ľ	
XIV. System performance				
System performance was found to be acceptable.				
XV. Overall assessment of data			1	
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates				Application of the state of the
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.		<u> </u>		

VALIDATION FINDINGS WORKSHEET

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

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol™	III. Benzo(a)pyrene*
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
G. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene™	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-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. Butyibenzyiphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyi-phenyi ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Bənzyl 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-Chloronaphthaiene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TT. 1,4- Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate™	uuu. Octachlorostyrene
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
0. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

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

1. Sept.

665 C29	in line
LDC #: 23	SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

Page: of Reviewer: 16 2nd Reviewer:

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

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

Was a method blank analyzed for each matrix?

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

Y N N/A Y N N/A

V/N N/A Was the blank contaminated? If yes, please see qualification below. Blank analysis date: 7/09/10

* = *

Sample Identification Associated Samples: 24 <u>~</u> MB 260-21081 Blank ID 1,60 FFF Conc. units: หลุ /1 Compound

Blank analysis date: Blank extraction date:

_		 		 	
	Sample Identification				
Associated Samples:					
	Blank ID				
Conc. units:	Compound				

LDC #: 23665 (29 SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

2nd Reviewer:_ Reviewer: Page:

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

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

Were target compounds detected in the field blanks?

M. Associated sample units: W. / kg.

1. 1. 2. 4. / 10. Y/N N/A

Blank units:

Sampling date: 1/24/16 Field Blank / Rinsate / Other:

Associated Samples: EB

1

Sample Identification									
Blank ID	74	0.55	6.39	75.0	19'0	6.67	0.73	6.67	1.8
Compound		797			HHH	111	ada	CROL KKK 6.67	千万十

Blank units: \(\sigma / L\) Associated sample units: \(\sigma \frac{\lambda \lambda \lambda \frac{\lambda \lambda \lambda \rangle \rangle \frac{\lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \frac{\lambda \lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambda \lambda \lambda \lambda \lambda \rangle \frac{\lambda \lambda \lambd

Associated Samples:

4-17

Sample Identification FB 0466 2010-RZB Blank ID 2.7 記述 Compound

5x Phthalates 2x All others

CRQL

LDC#: 23 665 C2 SDG#:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: 7 of eviewer: 3	۱,	À	
2nd R	Page: 7 of	Reviewer:	2nd Reviewer:

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

Were target compounds detected in the field blanks?

Blank units: レタイレ Associated sample units: い名 人 Sampling date: イムフ ル Field Blank)Rinsate / Other: Y/N N/A

7

18-

Associated Samples:

	tification					
	Sample Identification					
	Blank ID	FB-04072010-825	۲			
V o b	Blan	FB-04	4.2 <i>4.3</i> 3			
. Valia ala lia de la mise a la li	Compound		22			
						0

Associated sample units: Blank units:

Sampling date: ____________Field Blank / Rinsate / Other: _

Associated Samples:

= (2, 2, 3, 5, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,			
Compound	Blank ID	Sample Identification	
CROL			

5x Phthalates 2x All others

LDC#:_ 77665 (74

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	1 of
Reviewer:_	N
2nd reviewer:_	__

M	NETHOD: GC/MS BNA (EPA SW 846 Method 8	270C)		
	Were field duplicate pairs identificate N/A Were target compounds identificate	ied in this SDG? ed in the field duplicate	pairs?	
ſ		Concentration	ing ky	
	Compound	18	19	
	CC	140	29	
		Concentratio	<u>n()</u>	
	Compound			
	·			

. 18 1	19	KFD				
	2 2	111 (£ 360 D)				
140	29	11 (£ 360 D)				
Concentratio	n ()					
		RPD				
Concentration	on ()					
		}				

Concentration ()	
	RPD
	Concentration (

	Concentration (
		RPD
Compound		

LDC # 23665 (29

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

l of JVG Reviewer:_ Page: _ 2nd Reviewer:

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

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

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

 A_x = Area of Compound

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

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

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

X = Mean of the RRFs

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID Date	Date	Compound (Internal Standard)	(50 std)	(50 std)	(Initial)	(Initial)		
_	ICAL	7/3/2010	7/3/2010 1,4-Dioxane (IS1)	0.6102	0.6102	0.6008	0.6008	5.1	5.07
	MSSK		Naphthalene (IS2)	1.0418	1.0418	0.9914	0.9914	12.0	11.97
			alate	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 (1S5)	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

Area IS	211425	807956	462977	764720	816792	802029	
Area cpd	161271	1052210	720125	226817	1110735	1134417	
onc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20	

•		The second secon				
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
×	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.

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page \ of] Reviewer:_ 2nd Reviewer:

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

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

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

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

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

		Calibration		Average RRF	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	%D	%D
-	K5006	01/10/10	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								

		CCV1		CCV2		
Compound (Reference IS)	IS)	Concentration	Area Cpd	Area IS	Area Cpd	Area IS
		(IS/Cpd)				
,4-Dioxane	(IS1)	40/80	269321	237424		
laphthalene	(182)	40/80	1787366	918899		
Dimethyl phthalate	(183)	40/80	1278154	540703		
Hexachlorobenzene	(IS4)	40/80	405264	893628		
Chrysene	(185)	40/80	1911760	925248		
Benzo(a)pyrene	(981)	40/80	1972985	907080		

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LDC #: 23665 (25 SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof_1
Reviewer:	M
2nd reviewer:	<u> </u>

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: #

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	107	77.2	77	77	6
2-Fluorobiphenyl		78./	78	78	
Terphenyl-d14	J	709.3 79.9	80	80	
Phenol-d5	150	118. >	79	79	
2-Fluorophenol		114.5	76	76	
2,4,6-Tribromophenol	}	115.3	77	77	1
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

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

Sample ID:

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

220 21962 SDG #: See Care LDC #:

Matrix Spike/Matrix Spike Duplicates Results Verification **VALIDATION FINDINGS WORKSHEET**

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Page:	Reviewer:_	nd Reviewer

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

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

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

Where:

SC = Sample concentation

SSC = Spiked sample concentration SA = Spike added

MSDC = Matrix spike duplicate concentration

RPD = I MSC - MSC I* 2/(MSC + MSDC) MS/MSD samples:

MSC = Matrix spike concentration

	dS	ike	Sample	Spiked (ample	Matrix Spike	Spike	Matrix Spike Duplicate	Duplicate	MS/MSD	SD
Compound	Added (NS)	ded (<,)	Concentration ($M_{\rm S}/ _{\rm C}$)	Concentration	tration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
	MS	∂ MSD	0	MS	U MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2890	2910	٥	2250	פגזז	79	79	26	26	3	٢
Pentachiorophenol										:	
Pyrene	04 82	015c	Ф	23.70	2910	82	28	83	F3	7	λ

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 (24 SDG #: See Cover

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

Reviewer:___

2nd Reviewer: Page: lof 1

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

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample 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)

LCS/LCSD samples:

LCS. 280-21097 /2-A

	, c	iko	L.	lika	83-	v		CSD	1.05/1	CSJ I/SJ
2000000	PA /	Added	Conce	Concentration	Porrent Recovery	Vieword	Percent Recovery	Pecoverv	18	RPD
						(12,222				
	1.05	1 CSD	SDT	ıcsn	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	26 30	KA	1964.6	KTA	76	75				
Pentachlorophenol										
Pyrene	2630	_	2030		77	22				

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. 92000

LDC #: 3665 CZA SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u>l</u> _of <u>_1</u>
Reviewer:	Wt
2nd reviewer:	د ہ1

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

Y	Ν	N/A
$\sqrt{\lambda}$	Ν	N/A

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

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

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

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

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

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

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

V_i = Volume of extract injected in microliters (ul)

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

Df = Dilution Factor.

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

Example:

Conc. = $\frac{(52363)(}{(502630)(1.2017)(30.25)(6.931)(})($

= 123.3

~ 120 ng/kg/

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

				· J. D. BANGON CO. CO.		
	• • • • • • • • • • • • • • • • • • • •					
						<u>.</u>
<u> </u>		<u> </u>			<u> </u>	<u> </u>

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

SSA05-05-7BPC

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-octyl phthalate 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 SSAK5-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC

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)	Р

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)	А

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

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a Stage 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:

	Concentrati	on (ug/Kg)	RPD	D:#		
Compound	SSAJ2-05-5BPC_FD	SSAJ2-05-5BPC	(Limits)	Difference (Limits)	Flags	A or P
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)	Α
Octachlorostyrene	1500	410	<u>-</u>	1090 (≤370)	J (all detects)	Α
Phenanthrene	370U	30	-	340 (≤370)	-	-
Pyrene	13	35	_	22 (≤370)	-	<u>-</u>

	Concentrat	ion (ug/Kg)	RPD Difference			
Compound	SSAK6-05-1BPC	SSAK6-05-1BPC_FD	(Limits)	(Limits)	Flags	A or P
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)	А
Octachlorostyrene	1200	550	+	650 (≤360)	J (all detects)	А

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 SSAJ2-05-5BPC SSAJ2-05-10BPC** SSAK5-05-1BPC SSAK5-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAK6-05-1BPC SSAO5-05-5BPC SSAO5-05-5BPC SSAO5-05-9BPC EB-06292010-RZD	All compounds reported below the PQL.	J (all detects)	Α .	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)	А	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	А	ld
280-4960-1	SSAK3-06-1BPC	Bis(2-ethylhexyl)phthalate	96U ug/Kg	А	bl
280-4960-1	SSAK3-06-2BPC	Bis(2-ethylhexyl)phthalate	95U ug/Kg	А	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	А	bl
280-4960-1	SSAJ2-05-5BPC	Bis(2-ethylhexyl)phthalate	97U ug/Kg	А	bl
280-4960-1	SSAK5-05-9BPC	Bis(2-ethylhexyl)phthalate	95U ug/Kg	А	bl
280-4960-1	SSAK6-05-1BPC	Bis(2-ethylhexyl)phthalate	93U ug/Kg	А	bl
280-4960-1	SSAK6-05-1BPC_FD	Bis(2-ethylhexyl)phthalate Dimethylphthalate	92U ug/Kg 39U ug/Kg	А	bl
280-4960-1	SSAO5-05-5BPC	Bis(2-ethylhexyl)phthalate Dimethylphthalate	180U ug/Kg 47U ug/Kg	А	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

Date:	84040
Page:_	lof
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2nd Reviewer:

SDG #: 280-4960-1 Laboratory: Test America

LDC #: 23665E2a

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 /10
11.	GC/MS Instrument performance check	A	,
111.	Initial calibration	A	2 K2D YY
IV.	Continuing calibration/ICV	A	Ca/10 = 25 }
V.	Blanks	SW	
VI.	Surrogate spikes	A	·
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	us/b
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	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	Ä	
XVI.	Field duplicates	WZ	$D_1 = 6.7$ $D_2 = 11.12$ TEB = 17 $TEB = *FB - 04072010 - RZC (from 250 - RZC)$
XVII.	Field blanks	2M	*EB = 17 FB = *FB - 04072010 - RZC (from 280- = FB - 04072010 - RZD (from 280-

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

** Indicates sample underwent Stage 4 validation Validated Samples:

	501 + V	Vate	1		
†	SA94-0BPC S	† 1	SSAK6-05-1BPC Py S	21	MB 280 - 21548 /-431
∔ 2	SA105-0BPC	12	SSAK6-05-1BPCFD D	22	MB 280 - 21500 /-A 32
†	SSAK3-06-1BPC	1 3	SSAK6-06-1BPC	23	/ 33
r	SSAK3-06-2BPC	14	SSAO5-05-5BPC	24	34
+ 5	SSAJ2-05-1BPC	† 15	SSAO5-05-7BPC	25	35
+	SSAJ2-05-5BPCFD 1	† 16	SSAO5-05-9BPC	26	36
7	SSAJ2-05-5BPC	17	EB-06292010-RZD W	27	37
8	SSAJ2-05-10BPC**	18	SSAJ2-05-1BPCMS	28	. 38
† 9	SSAK5-05-1BPC	19	SSAJ2-05-1BPCMSD	29	39
10	SSAK5-05-9BPC	20		30	40

LDC #: 23665 E 29 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 11
2nd Reviewer: 12

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)				
Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times				Control of the second
All technical holding times were met.	_			
Cooler temperature criteria was met.				Markatan kanggaran kanggaran da 42
II. GC/MS Instrument performance check				A Secretary Secretary and Secretary
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				Lakethar at the second
Did the laboratory perform a 5 point calibration prior to sample analysis?	/	<u> </u>		
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Was a curve fit used for evaluation?	_			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?				
Were all percent relative standard deviations (%RSD) < 30% and relative response factors (RRF) > 0.05?				
IV. Continuing calibration	ı			
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	/			
V. Blanks	1			
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				Medical Commission Com
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?	L	<u></u>	<u> </u>	

LDC #: 236 \$5 E 2a SDG #: Sce Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 5M
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				A PROPERTY OF THE PROPERTY OF
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?	1			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	1			
Were chromatogram peaks verified and accounted for?	vooran haa			
XII. Compound quantitation/CRQLs	7			A CONTRACTOR OF THE STATE OF TH
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)				ing and the second seco
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		/		
XIV. System performance				
System performance was found to be acceptable.				
XV Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XVI: Field duplicates	*			
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.				
XVII. Field blanks			111	
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.				

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. Hexachlorocyclopentadiene⁴	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohoi
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	ТТТ.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	nnn
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	ww.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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lof D Page: Reviewer: 2nd Reviewer.

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

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

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level?

Was a method blank associated with every sample?

<u>4</u> ≥ Associated Samples: Nas the blank contaminated? If yes, please see qualification below. Blank extraction date: 7/10/10 Blank analysis date: 7/10/10 Associated Samples Conc. units:

Blank extraction date: 1/01/10 Blank analysis date: 7/11/10 Conc. units: 1/9/1-	Compound Blank ID	MB 240-	CCC 0,597	17.7 0,530	56.6 0.6cz	189.0 777	HHH 0,621	FFF 1.90	7× 034
lysis date: 7/11/10 Associated Samples:		MB 280-21500 K-A							
411 W (ND)	Sample Identification				,				

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	Compound	Blank ID					Sample Identification	ıtion			
Ľ,		MB 280-2 548 K-A	548 h-A	(xb) 1	7	8	1	5	9	7	a)
483.9	EEE	96.7		120/u	(ep2)	n/ 96	h/ 56	1/251	110/4	47/4	1/26
196,5	3	38.9			n/02			100/1	1/ 22		

5x Phthalates 2x all others

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42	4
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Lage.	Reviewer:	2nd Reviewer:

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

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

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level?

Was a method blank associated with every sample?

Was the blank contaminated? If yes, please see qualification below. In date: 7/6. N N/A

Associated Samples: 42/2 _Blank analysis date:_ Stank extraction date: 7/01

(19)

Sample Identification 180/1 42/2 4 A-4842 16-080 GM 96.7 38.9 Blank ID 玩 ટ Compound Conc. units: " 194.5

canalysis date:	Associated Samples:	
llank extraction date:Blank a	onc. units:	

1	 	-	 	
Sample Identification				
Samp				
Blank ID				
Compound				

5x Phthalates 2x all others

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VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Reviewer:_ 2nd Reviewer:

> METHOD: GC/MS BNA (EPA SW 846 Method 8270C) Y N N/A

Were field blanks identified in this SDG?

Sampling date: 4 /07 /10

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

3 Associated Samples:

Compound	Blank ID	D Sample Identification	
	FB-04072010-RZD		
EEE	2,2	Resurts either ND or > 5x FB	
CROL			

Associated sample units: Blank units:_

Sampling date:_

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

Associated Samples:

		None and the second			
fion			-		
Sample Identification					
Sample Identi					
Blank ID					
Compound					
Comp					CROL

5x Phthalates 2x All others

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VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: of 1 Reviewer: No

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

Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N/A

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

		r —	_	т—		T	 т-	T	T	T -	_		T		T	ī	_
Qualifications	J/WJ/P (2)	70															
Associated Samples	unresomed																
Finding	peoks																
Sample ID	12611415																
Date																	
*																	

Comments: See sample calculation verification worksheet for recalculations

LDC#: 23665E2a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page	: <u> </u>
Reviewer:	3/4
2nd Reviewer:	10

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

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

Garage d Name	Conc (ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	6	7	(≤50%)	Dili	DIII CIIII(3	(Parent Only)
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	

Commound Name	Conc (ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	11	12	(≤50%)			(Parent Only)
Benzo(b)fluoranthene	31	360Ú		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

1DC# 2066/ 12 SDG#: See Car

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

ō o Page: Reviewer:

2nd Reviewer:

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

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

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

 A_x = Area of Compound

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

average RRF = sum of the RRFs/number of standards

X = Mean of the RRFs

%RSD = 100 * (S/X)

Standard ID

#

MSS Y ICAL

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

Recalculated %RSD 2.76 5.16 7.56 11.87 2.67 3.07 Reported %RSD 11.9 7.6 5.2 2.8 2.7 3.1 Average RRF Recalculated 0.5956 1.0173 1.1052 1.3194 0.2182 1.1400 (Initial) Average RRF Reported 1.0173 0.5956 1.1400 1.1052 0.2182 (Initial) 1.3194 Recalculated 50 std) 1.1410 1.1756 0.6158 0.2154 1.0634 1.3341 RRF Reported 50 std) 0.6158 1.1410 1.1756 1.0634 0.2154 1.3341 RRF (182) (183) (181) (IS4) (185) (186) Compound (Internal Standard) Benzo(g,h,i)perylene Hexachlorobenzene Naphthalene 1,4-Dioxane Chrysene Fluorene Calibration 7/9/2010 Date

Area IS	187040	701327	1 461853	766351	2 829504	2 678395
Area cpd	143983	1000260	770171	206297	1218972	901732
nc IS/Cpd	40/20	40/20	40/20	40/50	40/20	40/50

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
×	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.

VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page _\of_ \]
Reviewer: _\underset{JVG}
2nd Reviewer: _\underset{\omega}

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:

100 * (ave RRF - RRF)/ave RRF

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

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

ave. RRF = initial calibration average RRF

Where:

RRF = continuing calibration RRF

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

Reported Recalculated
_
RRF) %D
(
(CC RRF 0.5723 1.1067
(CC RRF) 0.5723 1.1067
(CC 0.5
(Initial RRF)
Calibration
O

Compound (Reference IS)	(S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	222838	194703
Naphthalene	(182)	40/80	1722369	778131
Fluorene	(183)	40/80	1397190	516987
Hexachlorobenzene	(184)	40/80	381941	870926
Chrysene	(185)	40/80	2250409	976865
Benzo(g,h,i)perylene	(981)	40/80	1746301	808463

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LDC#: 3665 = 29 SDG#: Sre Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	<u>lof 1</u>
Reviewer:_	SU
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	
2-Fluorobiphenyl	1	72.5	77	77	
Terphenyl-d14	-	97.7	9 x	98	/
Phenol-d5	150	124.6	83	83	
2-Fluorophenol	1	123.9	. 83	8 3	
2,4,6-Tribromophenol	8	111, 7	74	74	
2-Chlorophenol-d4					
1 2-Dichlorobenzene-d4					

	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 E 2a SDG #: See Core

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: lof L 2nd Reviewer: Reviewer:_

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

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

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

Where: SSC = Spiked sample concentration SA = Spike added

MSDC = Matrix spike duplicate concentration

SC ≈ Sample concentation

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

MSC = Matrix spike concentration

MS/MSD samples:

∞

	-11-0	O Clause	Shedins	elume	Matrix Spike	nike	Matrix Spike Duplicate	Duplicate	MS/MSD	รม
	Added (N. //)	Concentration	Concentration	ration	Percent Recovery	scovery	Percent Recovery	ecovery	RPD	
a modern	WS WSD	0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
According	3320 3290	0	2430	2382	73	73	77	72	٨	٨
Acetaplitation	-									
Pentachlorophenol			,			47	1,7	Ī	7	7
Pyrene	3320 3290	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	430	2340	73	^	,			\ \ \

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.

SDG#: See Cover Lal

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

Page: lof 1.
Reviewer: Mc

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 780

les: US 280- 21548/2-A

	<i>.</i>	ika	S	ike	SOI	S	ម	CSD	/SDT	CS/I CSD
Compound		Added (VC /E)	Conce (74)	Concentration (MS /k.)	Percent Recovery	ecovery	Percent Recovery	ecovery	RF	RPD
		0	<u>-</u>	S I Cen	Renorted	Recalc	Renorted	Recalc.	Reported	Recalculated
	2	7187								
Phenol										
N-Nitroso-di-n-oropylamine										
4-Chloro-3-methylphenol										
Aranachthana	2580	M	18.50		77	77				
Doctor										
Pyrene	28.50		2000		%	28				

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

LDC#:_	23	665	F	26
SDG #:_				

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

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

Percent solids, applicable to soil and solid matrices only.

Factor of 2 to account for GPC cleanup

N	N/A
N	N/A

%S

2.0

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

Concer	ntration	= $(A_{s})(I_{s})(V_{s})(DF)(2.0)$ $(A_{s})(RRF)(V_{o})(V_{s})(%S)$	Example:
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	11571 y 4-10 y 1000 y 1000 y
i _s	=	Amount of internal oterials as a second of the second of t	Conc. = $\frac{(1571)(40)(1.0 \text{ m})(100)(}{(710697)(0.2187)(20.4)}(0.916)($
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V,	=	Volume of extract injected in microliters (ul)	= 107, Y
v,	=	Volume of the concentrated extract in microliters (ul)	Y have h
Df	=	Dilution Factor.	7 110 ng /k

Reported Calculated Concentration (Concentration (C

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

Chlorinated Pesticides



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)	А

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

	Concentrat	ion (ug/Kg)	BBB	D:#		
Compound	RSAQ4-3.00BPC	RSAQ4-3.00BPC_FD	RPD (Limits)	Difference (Limits)	Flag	A or P
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)	А
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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date:	8/11/	10
Page:_	of	1
Reviewer:	_ √	Ъ
2nd Reviewer:	1	_

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/23/fo
II.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	r
IV.	Continuing calibration/ICV	A	ca / 4 € 20 8
V.	Blanks		
VI.	Surrogate spikes	<u> </u>	
VII.	Matrix spike/Matrix spike duplicates	SW_	
VIII	Laboratory control samples		LCS A
IX.	Regional quality assurance and quality control	N	
Xa	Fiorisil 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 = 15
XV.	Field blanks	N	,

Note:

A = Acceptable

LDC #: 23665B3a

SDG #: 280-4859-1 Laboratory: Test America

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

	Soil				
+ 1	RSAQ4-3.00BPC b	11	MB 280-21131/-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	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 #: 37665 B3 a SDG #: See Cores

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2 Reviewer: 116 2nd Reviewer: ____

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

Validation Area	Yes	No	NA	Findings/Comments
Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?				
II. Initial calibration				T
Did the laboratory perform a 5 point calibration prior to sample analysis?	/	<u> </u>	-	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations $(\%RSD) \leq 20\%$?	N	/	_	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	6		<u> </u>	
Did the initial calibration meet the curve fit acceptance criteria?	4		_	
Were the RT windows properly established?	/			
Were the required standard concentrations analyzed in the initial calibration?		1		
V. Continuing calibration	т -	а	.	Т
What type of continuing calibration calculation was performed?%D or%R	1/		-	
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	(1_		
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?				
Was a continuing calibration analyzed daily?	1			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?	/		_	
Were all the retention times within the acceptance windows?	\perp	4_		
V Bjanks				T
Was a method blank associated with every sample in this SDG?	1			
Was a method blank analyzed for each matrix and concentration?	1	4		
Were extract cleanup blanks analyzed with every batch requiring clean-up?	1	4	_ _	
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		ر [1	
Vt. Surrogate spikes		4		T
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?				Λ
VII. Matrix spike/Matrix spike duplicates				

LDC #: 23665 876 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

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?			<u> </u>	
VIII. Laboratory control samples	r /		τ	T
Was an LCS analyzed for this SDG?	1			
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Quality Assurance and Quality Control	<i>'</i>		 	1
Were performance evaluation (PE) samples performed?	<u> </u>		1_	/
Were the performance evaluation (PE) samples within the acceptance limits?				1
X. Target compound identification		.		T
Were the retention times of reported detects within the RT windows?	[]			
XI. Compound quantitation/CRQLs				1
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?		1_		
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.	+-	+	\dashv	
Target compounds were detected in the field duplicates.	_1⁄_	1		
XV Field blanks	-		L	
Field blanks were identified in this SDG.	_		4	
Target compounds were detected in the field blanks.			1	

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

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Arocior-1242	00. 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	Ή.
D. garmma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4"-DDD	U. Toxaphene	cc. DB. 608 - 1 4 '- DbD	KK.
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB.1704. 2, 4!- DDE	u.
G. Heptachior epoxide	0.4,4'-DDT	W. Aroolor-1221	EE. 2,41- DDT	MM.
H. Endosulfan I	P. Methoxychlor	X. Arocior-1232	FF. Hexach Um benzene	NN.

Notes:

LDC #: 93665 B34 SDG#.

Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

2nd Reviewer: 1 Reviewer: Page:

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

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

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

Qualifications	V	(Mes veso in)				No mad	C LCS also m																			
Associated Samples	٠															(() ()	(((
RPD (Limits))	()	())))))))))))))))))))	
MSD %R (Limits)	-664 (58-115)	()	()	()	(NC (54-130	()	()		(()	()	()		())	()	()	()	()		()))	
MS %R (Limits)	-470 (58 11C)	1)		NC (54-135)		()	()			()	()	()	()	()	()))	(()))	`	
Compound	ď	+				7																				
didsman	- (-)		(()			6/0	1/7																			
 	Page 1																									

LDC #:_	236	15	B34
SDG#:			

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	__of	1
Reviewer:	JV4	
2nd reviewer:	1	

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

1	\widehat{Y}	N	N/A
	Z	N	N/A

		Ĺ	Concentration	on (ng /kg)		Parent
•	Compound			5		epo mhy
		J	2. 2	2.8	0.2 (= 9	.20)
		0	6.2	5,4	0.8	
		A	1.]	9.2 U	8.1	5/43/A
	-	В	57	43	14	JATA
		FF	1.4	9.24	7.8	<i>y</i>
			Concentration	op ()		
	Compound				R	PD .

	Concentration (
Compound		RPD

	Concentration ()	
Compound		RPD

LDC# 23665 Bra

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: Wt.

Page: (of €

GC EPA SW 846 Method 8081A METHOD:

g-BHC Parameter

Date	Column	Compound	X Area	≻ Conc	X^2
06/29/2010	RTI-XLB	g-BHC	122560.00	4.00	16.00
			307596.00	10.00	100.00
	O 800		738566.00	25.00	625.00
	1		1426013.00	50.00	2500.00
			2028332.00	75.00	5625.00
			2654330.00	100.00	10000.00

				•
Regression Output:	-		Reported	
Constant		11414.20584	= 3	X X
Std Err of Y Est		16515.67468		
R Squared	Apple and the second se	0.99984	r2 =	0.999900
No. of Observations		6.00000		
Degrees of Freedom		3.00000		
	A CANADA PARA PARA PARA PARA PARA PARA PARA P		ii	N N
X Coefficient(s)	29725.029962	-33.843748	= q	NR
Std Err of Coef	789.337008	7.56		

30640.00 30759.60 29542.64	28520.26 27044.43	26543.30
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28841.70

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PC # 54962 B34

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

Reviewer: 1

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Page: __

METHOD:

GC EPA SW 846 Method 8081A

Parameter:

4,4'-DDT

X^2			A Label and Section (Conference on Conference on Conferenc	Video 1.				
*	Conc	4.00	10.00	25.00	50.00	75.00	100.00	
×	Area	63410.00	175756.00	469540.00	979235.00	1457421.00	1960060.00	
	Compound	4,4'-DDT						
	Column	RTI-XLB		o_soe				
	Date	06/29/2010						

Regression Output:	put		Reported	
Constant		0000000	II O	1.00000
Std Err of Y Est		14489.31386		
R Squared		0.99963	r2 =	0.399700
No. of Observations		0000009		
Degrees of Freedom		5.00000		
			m1 =	19615
X Coefficient(s)	19507.263066	0.444903		
Std Err of Coef.	105.489177	0.11		

19600.60 19432.28 18781.60 19584.70

15852.50 17575.60

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18471.21

LDC # 23665 \$34

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

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Page:

METHOD:

GC EPA SW 846 Method 8081A

Parameter:

g-BHC

Column	Compound	× 4	\ \	Xv2
	Suppoduo O	200		
	g-BHC	140307.00	4.00	
		348407.00	10.00	
		856787.00	25.00	
		1688247.00	50.00	The state of the s
		2474905.00	75.00	
		3254088.00	100.00	

				,
Regression Output:	put:		Reported	-
Constant		0.00000	= 0	0.00000
Std Err of Y Est		31114.16048	The state of the s	- The state of the
R Squared		0.99937	12 =	0.999500
No. of Observations		0000009	A CONTRACTOR OF THE CONTRACTOR	to the Article Annual A
Degrees of Freedom		2.00000	The state of the s	
			m1 m	33321
X Coefficient(s)	32911.268843	0.444903	Managar / Processing Community of the Co	
Std Err of Coef.	226.526061	0.11		

34840.70 34271.48 32998.73 32540.88 33764.94

35076.75

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33915.58

LDC # 2006 Bya SDG# St. Corry

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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Page: __

GC EPA SW 846 Method 8081A

METHOD:

Parameter:

4,4'-DDT

X^2	16.00	100.00	625.00	2500.00	5625.00	10000.00	
√ Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	93261.00	236414.00	595206.00	1201442.00	1753584.00	2345896.00	
Compound	4,4'-DDT						
Column	RTI-35silms		ວ້ຽວອ				
Date	06/29/2010						

Regression Output:			Reported	
Constant		-3355.77251	II O	N. R.
Std Err of Y Est		12345.46710		
R Squared		0.99989	12=	0.999900
No. of Observations		0000009		
Degrees of Freedom		3.00000		
			ıı	N.
X Coefficient(s)	24211.079197	-7.727514	= q	R.
Std Err of Coef.	590.029427	5.65		nomen de la marca de la companya de la selación de la companya de la companya de la companya de la companya de

23381.12 23458.96 23808.24 24028.84 23315.25 23641.40

23605.64 Ave RF

LDC # 73665 839 SDG# _ E. C.

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: of Darwer: Darwe

METHOD: GC__HPLC_

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

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

Where:

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

						Reported	Recalculated	Reported	Recalculated
		Calibration			CCV Conc	Conc	Conc	O %	Ω%
#	Standard ID	Date	Compound	puno					
_	005F0501	7/9/2010	g-BHC	RTI-XLB	50	50.70	50.70	1.4	1.4
			4,4'-DDT	RTI-XLB	90	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									

				CCV1	CCV2
Compound	В	q	O	Area	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 #:_	7346	5 B76
SDG #:_	See	_ Com

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	1	_of_	
Reviewer:	_		Ve
2nd reviewer:		\checkmark	

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

The percent recoveries	(%R) of surrogates were recal	culated for the comp	ounds identified be	elow using the fol	lowing calculation:
The nercent recoveries	1%K) Of Suffociates were recar	culated for the comp	Juditus luctivited by	cion danig are to	iowing outoutation.

% 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		20	17.7	88	88	9
Decachlorobiphenyl		1	181	90	90	J
Decachlorobiphenyl	æ					

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Fetrachloro-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						
Tetrachioro-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:_	 		
	 		-

SDG #: 25. Com

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates Results Verification

Page: of A Reviewer: 2nd Reviewer:

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

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

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

Where: SSC = Spiked sample concentration SA = Spike added

SC = Concentration

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

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

(G)
MS/MSD samples:

Recalculated MS/MSD RPO Reported Recalc. Matrix Spike Duplicate Percent Recovery 126 Reported 98 79 Recalc. 70 63 Percent Recovery Matrix Spike Reported 74 20 MSD 30,91 Spiked Sample Concentration 17.8 70,00 ا ق Ş Concentration 16.75 16.75 Sample 0 18.2 MSD Spike Added S E \propto Compound gamma-BHC Aroclor 1260 4,4-DDT

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

SDG #: - くん くかく Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification VALIDATION FINDINGS WORKSHEET LDC #: 23 665 \$ 34

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Page:	Reviewer:	Dovious.

2nd Reviewer.__

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

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample 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 = ILCS - LCSD I * 2/(LCS + LCSD)

LCS 280-21121 /2-A LCS/LCSD samples:__

		Recalc.					I		Ī
TCS/TCSD	RPD								
		Reported							
rcsp	Percent Recovery	Recalc.							
נ	Percent	Reported							
S	ecovery	Recalc.	86)ul					
TCS	Percent Recovery	Reported	86	301					
Sample	ntration (c)	CSD /	47						
Spiked	Concentration ($V_{\mathcal{C}}$ / \mathcal{C})	SOT	1s.9	17.1					
pike	Added (vc./c.)	CcsD	K A						
<i>ั</i> ด •	¥ ¥)	SOT	16.3	~					
	Compound		gamma-BHC	4,4'-DDT	Arocior 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	B	3	4
SDG #:	Ca Co			

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	\mathcal{M}'_{-}
2nd reviewer:	

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

Υ	N	N/A
Y	N	N/A

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

Example:	
Sample I.D.	<u>M</u> :
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)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

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

Date: 8/10 /10
Page: 1 of 1
Reviewer: _V/L
2nd Reviewer:

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 6 /29 //o
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	H	r ²
IV.	Continuing calibration/ICV	A	CONTON E 20 B
V.	Blanks	A	
VI.	Surrogate spikes		
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	*	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	<u> </u>	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	Ä	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB-04672010- KZD (from 280-2216->

Note:

A = Acceptable

LDC #: 23665E3a

SDG #: 280-4960-1 Laboratory: Test America

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

TB = Trip blank EB = Equipment blank

D = Duplicate

Validated Samples: ** Indicates sample underwent Stage 4 validation

	Soil					
+	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	100.0	18		28	38	
9	Totals	19		29	39	
10	*	20		30	40	

LDC #:		
SDG #:	Sec	Cores

VALIDATION FINDINGS CHECKLIST

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

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

Validation Area	Yes	No	NA	Findings/Comments
Technical holding times	1 103	1 110	1 114	I munigatoonninenta
All technical holding times were met.	_			
Cooler temperature criteria was met.				
II. GC/ECD Instrument performance check	I	1	l	I
Was the instrument performance found to be acceptable?	/		**********	
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations $(\%RSD) \leq 20\%$?				
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	/			
Did the initial calibration meet the curve fit acceptance criteria?	/			
Were the RT windows properly established?	/			
Were the required standard concentrations analyzed in the initial calibration?				
IV. Continuing calibration		•		
What type of continuing calibration calculation was performed?%D or%R	4			
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?			رز	/
VII. Matrix spike/Matrix spike duplicates				

LDC #:_			
SDG#:	Cee	Correc	

VALIDATION FINDINGS CHECKLIST

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

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?	/			Annant de la company de la
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		<u> </u>		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		(
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.	٠			
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.				

たる 19926 #DOT

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

Page: | of 4

GC EPA SW 846 Method 8081A METHOD:

4,4'-DDE Parameter:

100.00 Conc 10.00 25.00 50.00 75.00 4.00 367629.00 553591.00 746237.00 24777.00 166083.00 60820.00 Area × Compound 4,4'-DDE GCS_P1 Column CLP1 07/14/2010 Date

	177		
Regression Output:		Reported	
Constant	-10028.67169	= 0	NR

0.999700

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0.99967 6.00000 3.00000

6780.30600

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3.10

2.720127

7302.996652 324.052547

Degrees of Freedom No. of Observations

X Coefficient(s) Std Err of Coef.

Std Err of Y Est

R Squared

6082.00	6643.32	7352.58	7381.21	7462.37	

5625.00 10000.00

2500.00

100.00 625.00

16.00

X₂

6194.25

685	
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Ave	

6852.62
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LDC# 23665 E34

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: V of 4 Reviewer: N. 2nd Reviewer:

GC EPA SW 846 Method 8081A

METHOD:

g-BHC

Parameter:

Y	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	41036.00	98040.00	245241.00	493759.00	718059.00	944144.00	
Compound	g-BHC						
Column	CLP1		GCS_P1				
Date	07/14/2010						

		The state of the s	- Publication	
Regression Output:			Reported	
Constant		-1618.43608	= 0	N.
Std Err of Y Est	-	3884.46394		
R Squared		0.99993	- 21	0.999900
No. of Observations	The state of the s	0000009		
Degrees of Freedom		3.00000		
The state of the s	AND THE PROPERTY OF THE PROPER		11	NR
X Coefficient(s)	10179.374760	-7.281105	= q	NR
Std Err of Coef.	185.650977	1.78		

9804.00 9809.64 9875.18 9574.12 9441.44

> 2500.00 5625.00 10000.00

100.00 625.00

16.00

X,2

10259.00

Ave RF

9793.90

LDC#2465 EBA

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: Mc 2nd Reviewer:

of the solution of the solutio

Page:

METHOD:

4,4'-DDE Parameter:

GC EPA SW 846 Method 8081A

 10000.00	100.00	881337.00			
 5625.00	75.00	667703.00			
 2500.00	50.00	457518.00			
 625.00	25.00	230539.00		GCS_P1	
100.00	10.00	94871.00			
16.00	4.00	41028.00	4,4'-DDE	CLP2	01/14/2010
	Conc	Area	Compound	Column	Date
 X^2	>	×			

	The state of the s	A STATE OF THE STA		
Regression Output:			Reported	
Constant		3336.23022	= 0	NR
Std Err of Y Est		2686.14587		
R Squared		96666.0	r2 =	1.000000
No. of Observations		0000009		
Degrees of Freedom		3.00000		
and the state of t	1 TO THE RESIDENCE OF THE PARTY		a II	N R
X Coefficient(s)	9266.520668	-4.949795	= q	NR
Std Err of Coef.	128.379518	1.23		

9487.10 9221.56 9150.36 8902.71 8813.37

10257.00

Ave RF

9305.35

LDC# 27665 E34

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

d of ¢

Page:

GC EPA SW 846 Method 8081A METHOD:

g-BHC Parameter:

	10.000	16.00	100.00	625.00	2500.00	5625.00	10000.00	
-	Conc	4.00	10.00	25.00	50.00	75.00	100.00	
×	Area	45221.00	105794.00	266409.00	516454.00	741495.00	968090.00	
	Compound	g-BHC			-			
	Column	CLP2		GCS_P1	l			
	Date	07/14/2010						

			Renorted	
Regression Output.			non lodon i	
Constant		1508.72604	= o	NR.
Std Err of Y Est		4305.62745		
R Squared	The second secon	0.99992	12 =	0.999900
No. of Observations		0000009	And the second s	
Degrees of Freedom		3.00000		
	AND THE RESIDENCE OF THE PROPERTY OF THE PROPE		m II	NR
X Coefficient(s)	10813.705547	-11.682796	p =	NR
Std Frr of Coef	205.779731	1.97		

10579.40	10656.36	10329.08	9886.60	06.0896	

11305.25

10406.27 Ave RF

LDC # 23665 E34

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: of Areviewer: Other

METHOD: GC___HPLC___

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

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

Where:

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

					Reported	Recalculated	Reported	Recalculated
		Calibration		CCV Conc	Conc	Conc	Q %	Q%
#	Standard ID	Date	Compound					
_	00550501	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
			a-BHC CLP2	50	48.6	48.6	2.8	2.8
			0					
c								
7								

Calculation

 $Y = a(X^2) + bX + c$

(b^2 - 4aT) () \ 1/2 (-b+ ()) / 2a (-b-()) / 2a	5/563805 /58/,08145 52.5859019 -2/30.1254/ 89/78023 9443,41161 50.5392483 1347.51431	77288178 8791.36951 47.9970545 1824.10485 93721079 9680.96477 48.6074043 877.258762	54076530
T = Y-c	-391486.6717 -495860.4361	433362.7698	-68742.67169
final conc			3.33
Conc.	52.58356 50.53925	47.99705	9.38039
v	-10028.67169	3336.23022	-10028.67169
۵	7302.99665	9266.52067	10816.7055 7302.99665
ત્વ	2.70127	4.94980	-11.68280 2.70127
Area Y	381458	436699	499678 58714
	dde clp1 7/20	g-BHC cip1 7/20 dde cip2 7/20 '	g-BHC clp2 7/20 SSAL3-06-2BPC

LDC #: 73665 E34 SDG #: <u>Su Cur</u>

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

Page:	_of
Reviewer:	NE
2nd reviewer:	<u></u>

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 o	alculation:
--	-------------

% 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	CIPI	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#: ~366 E E 34 SDG #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer:_ 2nd Reviewer:

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

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

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

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

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

4 MS/MSD samples:

	Š	ike	Sample	Spiked	Spiked Sample	Matrix	Matrix Spike	Matrix Spik	Matrix Spike Duplicate	×	MS/MSD
Compound	P (2)	Added (V< //c	Concentration (VC /C)	Conce	Concentration (Mg/Lc)	Percent	Percent Recovery	Percent	Percent Recovery		RPD
	MS	OMSD	0	WS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	(7. 9	17.9	Q	15.6	160	87	87	68	89	λ	٨
4,4'-DDT	-		8 -	18.7	19.5	A Y	46	99	99	7	7
Arocior 1260									/ /		

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

Control Sample/Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification VALIDATION FINDINGS WORKSHEET LDC# 73665 E32 SDG#:

2nd Reviewer:_ Page: Reviewer:_

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

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

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

Where:

SC = Concentration

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

SSC = Spiked sample concentration SA = Spike added

280-21544 200 LCS/LCSD samples:__

	Spi	ike	Spiked	Sample	SOT	Ş	วา	LCSD	/SOT	TCS/TCSD
Compound	Ad ¢ (५५	Added (1/6/1/9)	Concer (YS	Concentration (५५//८५)	Percent Recovery	lecovery	Percent F	Percent Recovery	α.	RPD
	SOT	CSD	SOT	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.6	NA	16,0	NA	96	36				\
4,4'-DDT	>		17. 7		40	60)				
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. 6440

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	M6
2nd reviewer:	

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

N/N/A

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

Example:

Sample I.D.
$$\frac{44}{\sqrt{1 - 4x^2 + 6x}} + \frac{44}{\sqrt{1 - 100}} = \frac{44}{$$

$$X = 9.38$$

final come. =
$$(9.38)(10 \text{ ml})$$

 $(31.09)(0.108)$
= 3.33 vs/kg

		• 1			
	a utalip	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
#	Sample ID				
 					
 					
11					1
1					
1					
				 	
I					
	1		<u></u>	<u> </u>	

Mater	
Note:	

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

Arsenic & Manganese



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)	А

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

	Concentra	tion (mg/Kg)	222	D.W.		
Compound	SA172-2.00BPC	SA172-2.00BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
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

	Date: 8- 2-10
	Page:of
	Reviewer:
2nd	Reviewer:

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

23665B4

SDG #: 280-4859-1

Laboratory: Test America

LDC #:___

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: G13/ID
11.	ICP/MS Tune	A	
Ш.	Calibration	A	
IV.	Blanks	A	
V	ICP Interference Check Sample (ICS) Analysis	7	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	N	1
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	À	N - T /
Χ.	Furnace Atomic Absorption QC	N	Notuiszeb
XI.	ICP Serial Dilution	N	Not presermed
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV	Field Duplicates	Su	(5,4)
XV	Field Blanks NO	See	FB=FB-04072010-BZD, FB-04072010-BZC, F864062010 (280-2280-2) (280-2280-2) (250-21
	A - A		(280-2216-2) (280-2280-2) (250-2

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

	50,1					
1	SA206-3.00BPC ✓	11	835	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:		
	No , Jana Sand	

LDC#: 2366584

VALIDATION FINDINGS CHECKLIST

Page: of Page: of Reviewer: 02

2nd Reviewer: 1

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

Wethod. Metals (EFA 5W 846 Method 66 1657 666,6625)				
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?			<u> </u>	
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 anayized for this SDG?			<u> </u>	
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#: 7366584

VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: _ C 2nd Reviewer: _ L

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?			L/	
IX. ICP Serial Dilution			1	
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%?			<u> </u>	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.	L			
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				T
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			î	
Were performance evaluation (PE) samples performed?		/	 	/
Were the performance evaluation (PE) samples within the acceptance limits?	<u> </u>			
XII. Sample Result Verification		T		T
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Overall assessment of data	, ,	·	7.	
Overall assessment of data was found to be acceptable.	/			
XIV. Field duplicates	1	Γ	-1 · ·	1
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.	/	<u> </u>		
Target analytes were detected in the field blanks.	N		<u> </u>	

LDC #: 236584

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: of Reviewer: Of 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, St. As, 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,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
T		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,
GEAA		Al Sh As Ba Be Cd Ca Cr Co Cu Fe Ph Mg Mn Hg Ni K Se Ag Na Tl V 7n Mo B Si CN

Comments: Mercury by CVAA if performed

LDC#: 23665B4

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: of Reviewer: 2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

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

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

LDC #: 2366384

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

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

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

%R = Found x 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
160	ICP/MS (Initial calibration)	Mn	34.0	0,07	<u> </u>	98	7-
	CVAA (Initial calibration)					-	
	ICP (Continuing calibration)					and the second s	
(C.V.)	ICP/MS (Continuing calibration)) Hs	50,4	800	<u> </u>	101	7-
	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 #: 23665/84

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: Zof Reviewer. 2nd Reviewer:

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 = Found × 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 = II-SDRI x 100

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / 1 (units) (mx) (K)	True / D / SDR (uni ts) ハタ (ねら	%R/RPD/%D	%R/RPD/%D	Acceptable (Y/N)
TCS PAS	ICP interference check	£	12 104 right	100 mg/L	[0-{	601	>
7.05	Laboratory control sample	02 UU	1.02	Q'07	101	00/	7-
>	Matrix spike		(SSR-SR)				
>	Duplicate						
>	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 #: 23/25/554

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of \
Reviewer:	a
2nd reviewer:	\sim

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

Y	N/A N/A	Have results I	been reported a thin the calibrat	and calculated corr ed range of the in:	ectiv /	cable questions are and within the line		
YNI	N/A	Are all detecti	ion limits below	the CRDL?				using the following
Detect equation	ed analy on:	te results for _						•
Concent RD FV	tration = = =	(RD)(FV)(Dil) (In. Vol.) Raw data concer Final volume (ml) -=	Recalc		16,77 mg 1000 99)(0,931)	<u>L</u>)(5) =	-7.8 mg/kg
ln. Vol. Dil	=	Initial volume (m Dilution factor	I) or weight (G)		(1,0	49)(0,931))	
				Analyte		Reported Concentration (mg/ks)	Calculated Concentration (Mg/kg)	Acceptable (Y/N)
#	<u> </u>	iample ID 니		Allalyte		7.8	7.8	4
						W. 5723		
	<u> </u>							
		<u></u>						
								,
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:

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

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)	А	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

	Date: 5	-3-10
	Page:_1	Lof
F	Reviewer:_	2_
2nd F	Reviewer:_	<u>i~</u>

METHOD: As (EPA SW 846 Method 6020)

23665C4

Laboratory: Test America

280-4864-1

LDC #:___

SDG #:

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24/10
11.	ICP/MS Tune	À	
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	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS/D
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Notutilized
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	NO	EB=7 FB= FB0406Z610-RZB (250-Z131-Z)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

D = Duplicate TB = Trip blank

EB = Equipment blank FB = Field blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

r 	all soil except 7	<u> </u>	zter			
1	SSAR4-04-1.00BPC	11	90m	21	31	
2	SSAR4-04-3.00BPC	12	PS	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	41,0
7	E806242010-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:		 	

23665C4

VALIDATION FINDINGS CHECKLIST

Page: of Page: of Page: of Page: Of Pag

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

Method:Metals (EPA SW 846 Method 6010B/7000/6020)	T		1	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<u>-</u> -			
All technical holding times were met.				
Cooler temperature criteria was met.			<u> </u>	
II. ICP/MS Tune			·	
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			L	
Were %RSD of isotopes in the tuning solution ≤5%?			<u> </u>	
III. Calibration			·	
Were all instruments calibrated daily, each set-up time?		,	<u> </u>	
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.		<i>-</i>		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.				
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#: 23666CY

VALIDATION FINDINGS CHECKLIST

Page: Z of Z Reviewer: _ C 2nd Reviewer: _ , _ _

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC		Y	,	
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		г.	 	
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)

<u>AN NA</u>

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

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

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

458855 # DOJ

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer:_ Page: 2nd Reviewer:

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

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

%R = Found x 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	AS	9'0h	795	ا کرا	107)~
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCO	ICP/MS (Continuing calibration)	AS	50.1	56.0	001	001	7
	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#_23665CY

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: Reviewer. 2nd Reviewer:

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 = Found 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 = $[S-D] \times 100$ (S+D)/2

Where,

S = Original sample concentration D = Duplicate sample concentration

%D = [I-SDR] × 100

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

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
ICS ARS	ICP interference check	Ms	7/br 201	100 ngl	کرہ	201)-
527	Laboratory control sample		L'bl	20.02	66	98	
P	Matrix spike	· · · · · · · · · · · · · · · · · · ·	(SSR-SR)	7'61	26	76	
b18	Duplicate		8,02	22.3	7	7	
7	ICP serial dilution いいわ		7.5	3.45	64	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#: 236554

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: <u></u>	of \
Reviewer:_	<u>a</u>
2nd reviewer:_	10

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

Y N N/A Y N N/A Y N N/A	Have results I Are results wi Are all detecti	been reported a thin the calibrate ion limits below to the call be	nd calculate ed range of t the CRDL?	d correctly? the instruments	•	ar range of the IC	
# (13.12)	ample ID		Analyte		Reported Concentration (WO C)	Calculated Concentration (IME IS)	Acceptable (Y/N)
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)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples 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:

	Concentration	on (mg/Kg)	PDD	Difference			
Compound	d SSAJ2-05-5BPC_FD SSAJ2-05-5BPC (Limits		(Limits)	(Limits)	Flags	A or P	
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)	А	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 ORKSHEET

LDC #:	23665E4	_ VALIDATION COMPLETENESS W
SDG #:	280-4960-1	_ Stage 2B/4
Laborato	ry: Test America	_

	Date:	63	-10
	Page:_	\of_	
	Reviewer:	R	_
2nd	Reviewer:	i~	

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	Α	Sampling dates: 6/29/10
11.	ICP/MS Tune	A	•
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	m6/2
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCSID
lX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Motorilized
XI.	ICP Serial Dilution	Ā	·
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	5W	(2,3)
XV	Field Blanks	NO	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	مت ا	,ter_			
1	SSAJ2-05-1BPC/	5 11	8300	21	31	
2	SSAJ2-05-5BPC/_FD	12	005	22	32	
3	SSAJ2-05-5BPC/	13		23	33	
4	SSAJ2-05-10BPC,**	14		24	34	
5	EB-06292010-RZD V	V 15		25	35	
6	SSAJ2-05-1BPC_MS) 16		26	36	
7	SSAJ2-05-18PC_MSD	17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	la 🔿	- m'	
	W	 (NJ) 5	

LDC#: 13665E9

VALIDATION FINDINGS CHECKLIST

Page: ___of___ Reviewer: _____ 2nd Reviewer: _____

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

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	F			
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			<u> </u>	
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?			<u> </u>	
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?	/		<u> </u>	
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) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	/			
VII. Laboratory control samples	····		r	
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#_ 2366584

VALIDATION FINDINGS CHECKLIST

Page: Z of Z Reviewer: ______ 2nd Reviewer: _______

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)			····	p					
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		·	т						
Were performance evaluation (PE) samples performed?		/	[
Were the performance evaluation (PE) samples within the acceptance limits?	<u> </u>	<u> </u>		1					
XII. Sample Result Verification	т	<u> </u>							
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/		<u> </u>						
XIII. Overall assessment of data									
Overall assessment of data was found to be acceptable.	/								
XIV. Field duplicates	r		.,						
Field duplicate pairs were identified in this SDG.	/	1							
Target analytes were detected in the field duplicates.		<u>L</u>							
XV. Field blanks									
Field blanks were identified in this SDG.	/	1							
Target analytes were detected in the field blanks.		/							

LDC#: 23665E4

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:of Reviewer: C
2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

<u>AN NA</u> VN NA Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

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

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LDC# 2388F 9

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer:_ Reviewer.

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

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

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 Where,

%R = Found x 100 True

Acceptable (Y/N) Reported %R 2 Recalculated 8 % R 0 True (ug/L) からた Found (ug/L) 5.0h Element F X CUC3:49CP/MS (Continuing calibration) CVAA (Continuing calibration) GFAA (Continuing calibation) ICP (Continuing calibration) ICP/MS (Initial calibration) Type of Analysis CVAA (Initial calibration) GFAA (Initial calibration) ICP (Initial calibration) Standard ID

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

LDC# 2366SEY

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: Zof 3 Reviewer. 2nd Reviewer:

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

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

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

%D = [I-SDR] × 100

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found 1811 Log KS	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
25 PRS	ICP interference check	MS	98,624glc	100 Light	66	56)_
57	Laboratory control sample		107 19,7	10.02(), (C)	66	8600+	
Q	Matrix spike		(SSR-SR) 21,6	23,6	76	93	
	Duplicate		25,6	35.8		0	
	ICP serial dilution		ON	Z OW	NC	MC	}

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 #. 23665 24

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: <u></u> ∫	of	
Reviewer:_	ac_	
2nd reviewer:_	h	_

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

Y N Y N Petect equation	N/A N/A N/A eed analy on: tration =	Have results ware all detective results for	been reported a vithin the calibrat tion limits below	ind calculat ed range of	ed correctly? f the instrum	ents and	d within the line		
#	Si	ample ID		Analyte		С	Reported oncentration	Calculated Concentration (Mg/Kg)	Acceptable (Y/N)
		4		As			5.2	5.2	7
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	* ***	- · · · · · · · · · · · · · · · · · · ·		······································		_			
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Note:_									

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

Perchlorate



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)	Α

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

VIII. Overall Assessment

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

IX. Field Duplicates

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 SHEET

LDC #: 23665B6	VALIDATION COMPLETENESS WORK
SDG #: 280-4859-1	Stage 2B/4
Laboratory: Test America	

Date:	8-2-10
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Reviewer:	CC-
2nd Reviewer:	in

ЛЕТНОD: (Analyte)_	Perchlorate	(EPA Method 314.0))	
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The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	Α	Sampling dates: 6/23/10
IIa.	Initial calibration	A	
llb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Clientspecified
V	Duplicates	N	3
VI.	Laboratory control samples	A	LESD
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	\mathcal{N}	
X	Field blanks	ND	FB=FB-04072010-RZD
Note:	A = Acceptable	ND = No compound	FB=FB-0407010-RZD (280-2216-2) s detected D = Duplicate

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected R = Rinsate

TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

	50,1					
1	SA179-3.00BPC.	11	PB5	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:		

Method: Inorganics (EPA Method See Cover)

Method:Inorganics (EPA Method See Cover)						
Yes	No	NA	Findings/Comments			
I. Technical holding times						
	L					
1						
	/					
IV. Matrix spike/Matrix spike duplicates and Duplicates						
		-				
		/				
		,	· · · · · · · · · · · · · · · · · · ·			
	-					
	-					
VI. Regional Quality Assurance and Quality Control						
			·			

LDC#: 2366586

VALIDATION FINDINGS CHECKLIST

Page: Z of Z Reviewer: 2nd Reviewer: V

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 #: 2245566

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: 2nd Reviewer:

Method: Inorganics, Method_

3.4.0

The correlation coefficient (r) for the calibration of $\frac{C(O_A)}{C(O_A)}$ was recalculated.Calibration date: $\frac{6/7/10}{10}$

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

%R = Found X 100

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

		1.			Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (#g/I)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.00284			
		\$2	2.5	0.0077	0.999314	0.999358	
		83	5	0.0154		"	
	C104	84	10	0.03108).
	-	SS	20	0.06039			_
		se	40	0.13055			
Calibration verification		TCN	92	19,0g	95		
Calibration verification	->	ردم	30	38.915 96	96		
Calibration verification	8						

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._

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: of Reviewer._ 2nd Reviewer:

METHOD: Inorganics, Method See Cover

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

Where, %R = Found x 100

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

True = concentration of each analyte in the source.

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

S :: 0

Original sample concentration Duplicate sample concentration

Where, RPD = $|S-D|_X \times 100$ (S+D)/2

,		Acceptable (Y/N))~		
	Reported	%R/RPD	56		
	Recalculated	%R/RPD	dd	-	
		True / D (units) my/ks	0,0996		
		Found / S (units) M	00976	(SSR-SR)	
		Element	Cloy		
		Type of Analysis	Laboratory control sample	Matrix spike sample	Duplicate sample
		Sample ID	\$7	>	\sim

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#: 2366585

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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2nd reviewer:	1

				2nd revie	wer:
METH	OD: Inorganics, Metho	od_See cover_			Ç
YNI	N/A Are results w	ow for all questions answered "N". been reported and calculated corr within the calibrated range of the institution limits below the CRQL?	ectiv?	re identified as "N	/A".
Compo	ound (analyte) results t lated and verified usin	or <u>COL</u> g the following equation:	rep	orted with a positi	ve detect were
Concent	ration =		- 711C/ 10	(5~)(100	-0.)
(0.0	-0.0004)(OF)(b))		0.07486+0.004 (0.01)\(\text{9.49}\(\text{0.1}		- 130
<u> </u>		-2	(0A1) X9A9X0,	∞3Z)	
#	Sample ID	Analyte	Reported Concentration (MARC)	Calculated Concentration (MSIG)	Acceptable (Y/N)
	4	C104	130	130	7
	**				
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)	А

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:

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

	Concentra	tion (mg/Kg)				
Analyte	SSAR4-04-1.00BPC	SSAR4-04-1.00BPC-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
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 SSAR4-04-5.00BPC SSAR4-04-7.00BPC SSAR4-04-7.00BPC SSAR4-04-7.00BPC 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	А	bf
280-4864-1	SSAR6-05-3.00BPC	Perchlorate	2.7U mg/Kg	А	bf
280-4864-1	SSAR6-05-5.00BPC**	Perchlorate	3.6U mg/Kg	А	bf
280-4864-1	SSAR6-05-5.00BPC_FD	Perchlorate	3.4U mg/Kg	А	bf
280-4864-1	SSAR6-05-7.00BPC	Perchlorate	2.8U mg/Kg	А	bf
280-4864-1	SSAR6-05-9.00BPC	Perchlorate	3.4U mg/Kg	А	bf

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-4864-\$1 Stage 2B/4

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Date: 6 710
Page: <u></u> of ∫
Reviewer:
2nd Reviewer:

Laboratory: Test America

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

LDC #: 23665C6

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/24/10
lla.	Initial calibration	A	•
ilb.	Calibration verification	A	
III.	Blanks	M	
IV	Matrix Spike/Matrix Spike Duplicates	A	m6/D
V	Duplicates	A	OP.
VI.	Laboratory control samples	A	LCSIV
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= FBO1072010- RZ
Note:	A = Acceptable N = Not provided/applicable	ND = No compounds R = Rinsate	FB04062010 - RZB D = Duplicate TB = Trip blank CZ80-Z/31-Z

SW = See worksheet

R = Rinsate

FB = Field blank

EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

	an on the	$\rho \sim \cdot$	J=000+01	·····			
1	SSAR6-05-1.00BPC	11	SSAR4-04-9.00BPC**	21	por	31	
2	SSAR6-05-3.00BPC	12	SSAR4-04-1.00BPC-FD	22	805	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:		

VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: cr

Method: Inorganics (EPA Method See Cover)

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.		<u> </u>	<u> </u>	
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?	<u></u>			
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)	<u> </u>			
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.		\	1	
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.		ſ		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		•		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.				
V. Laboratory control samples	_	•		
Was an LCS anaylzed for this SDG?		,		
Was an LCS analyzed per extraction batch?	7			
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?			.7	

LDC#: 23665C6

VALIDATION FINDINGS CHECKLIST

Page: 2 of Reviewer: 2nd Reviewer: 1

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

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Field Blanks

METHOD: Inorganics, EPA Method See Cover

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

N N/A

Sampling date: 6/24/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other: Blank units: ug/L Associated sample units: mg/Kg Sampling date: 6/24/10 Soil factor applied 10x

Reason Code: be

Associated Samples: All Soil

-	<u> </u>		 	_	T		i
			-				
ntification							
Sample Identification							
	No Qualifiers						
Action Limit		0.049					
Blank ID	13	0.49					
Analyte		3104					

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: Reviewer:

Were target analytes detected in the field blanks?

Were field blanks identified in this SDG?

N N/A

METHOD: Inorganics, EPA Method See Cover

SDG #: See Cover LDC #: 23665C6

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

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

Reason Code: bf

7.5 O 7.8 S Sample Identification 7 Associated Samples: All Soil 3.6 α 3,7 No Qualifiers **Action Limit** FB04062010-RZB (SDG#: 280-2131-33) Blank ID 92 Analyte CI04

LDC#: 23665C6

VALIDATION FINDINGS WORKSHEET Field Duplicates

7		•
Page:	l of	<u> </u>
Reviewer:_	<u> </u>	
2nd Reviewer:_		

Inorganics, Method: See Cover

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

	Concentrati	on (mg/Kg)				Qualification
Analyte	3	4	RPD (≤50)	Difference	Limits	(Parent only)
Perchiorate	3.6	3.4	6			

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

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

305985 HDC#

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: CZ

Method: Inorganics, Method

0.716

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

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

%R = Found X 100

Where,

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

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (Mg/I)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	1	0.00284			
10.000		\$2	2.5	0.0077	0.999314	0.999358	
	<i>ξ</i>	s3	5	0.0154) —
	50	s4	10	0.03108			
		s5	20	0.06039			
		9s	40	0.13055			
Calibration verification		IC	22	Pag	99		
Calibration verification		CCV	30	28,915	96		
Calibration verification	\rightarrow)	91	96 129'6	96		\rightarrow

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#: 23665CG

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Reviewer. 2nd Reviewer.

METHOD: Inorganics, Method See Cover

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

 $%R = Found \times 100$

Where,

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

True = concentration of each analyte in the source.

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

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

Where,

" " O

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
527	Laboratory control sample	clay	91,00,0	0,0990	66	99	<u>}</u> -
カ	Matrix spike sample		(ssr.sr)	538	86	001	
<u>_a</u>	Duplicate sample		L201	2 bb	7	7	

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 #: 2365C6

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	CZ_
2nd reviewer:	_12

METHO	DD: Inorganics, Method	d See cover			
Please Y N N Y N N Y N N	I/A Have results I/A Are results w	ow for all questions answered "N". Not apple been reported and calculated correctly? ithin the calibrated range of the instrumer tion limits below the CRQL?		e identified as "N/	A".
Compo	und (analyte) results for	orCO4_ g the following equation:	repo	orted with a positiv	ve detect were
Concenti 20.0	004)(DF)(Vol)	Recalculation:	201)(10)(100m	nL) _ 36.	75 mls
0.00	32)(WE)(% Solid)	(0.92)(10)(10) (10)(10)	9	1 Jugik
#	Sample ID	Analyte	Reported Concentration (mg \cap{\chi_S})	Calculated Concentration (MG KS)	Acceptable (Y/N)
	3	ClOy	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)	А

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)	А	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 4

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

,> .
Date: 8-2-10
Page: \ of \
Reviewer:
2nd Reviewer:

METHOD: (Analyte)_	Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 6(2Y)(0
lla.	Initial calibration	A	
IIb.	Calibration verification	A	
Ш.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms/0
V	Duplicates	A	DÉ
VI.	Laboratory control samples	A	LCS/P
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=E806242010-RZB, FB=FB04062010-RZB

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(250-4864-1) ed D = Duplicate

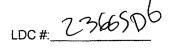
TB = Trip blank

EB = Equipment blank

Validated Samples:

r====	<u>Soil</u>					
1	SSAR4-04-10.00BPC	11	<i>७</i> ८५	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	
88		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:



VALIDATION FINDINGS CHECKLIST

Page: __of___ Reviewer: __c/__ 2nd Reviewer: ___

Method: Inorganics (EPA Method See Cover)

Method:Inorganics (EPA Method See cover)	Т			
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times			r	
All technical holding times were met.			<u> </u>	
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)	<u> </u>			
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	y	· · · · · · · · · · · · · · · · · · ·		
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			/	

VALIDATION FINDINGS CHECKLIST

Page: 2 of Reviewer: 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification	·	r''		
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: (Page: (

2nd Reviewer:

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

Were target analytes detected in the field blanks?

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 6/24/10 Soil factor applied 10x

Sampling date: 6/24/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Reason Code: be

_					 	 	
	ıtification	e.					i
nples: All	Sample Identification		An and the same department of the same depart				
Associated Samples: All							
4							
ier:		No Qualifiers		-			
/ Rinsate / Oth	Action Limit		0.049				
ield blank type: (circle one) Field Blank / Rinsate / Other	Blank ID	EB06242010-RZB (280-4864-1)	0.49				
ield blank type: (c	Analyte		0104				

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: ((3)
Review

2nd Reviewer:

SDG #: See Cover

LDC #: 23665D6

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

X N N/A

Were target analytes detected in the field blanks? Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/6/10 Soilfactor applied 10x

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

Reason Code: bf

₹

Sample Identification Associated Samples: **Action Limit** 9.5 FB04062010-RZB (SDG#: 280-2131-23) Blank ID 92 Analyte CIO4

40<u>59962</u>#301

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

	. ,	1
ا ا و	B	7 :
Page:	Reviewer:	nd Reviewer
_	œ	2

Method: Inorganics, Method ___

の、たろ

was recalculated.Calibration date: 6/7/10 The correlation coefficient (r) for the calibration of $\overline{\mathbb{C}(\mathbb{Q}_{+})}$

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

%R = Found X 100

Where,

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

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

			•		Recalculated	Reported	Acceptable
Type of analysis	Analyte	e Standard	Conc. (mg/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		rs.	1	0.00284			
		s2	2.5	0.0077	0.999314	0.999358	
×19433		s3	5	0.0154).
	(s4	10	0.03108			_
	T, 5	\$5	20	0.06039			
		gs	40	0.13055			
Calibration verification		TCV	2	900'61	96		
Calibration verification		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	30	35,356	10%		
Calibration verification	\rightarrow				۵		•

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**

Page: Reviewer: 2nd Reviewer:

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 × 100

Where,

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

True = concentration of each analyte in the source.

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

Where, RPD = $S-DL \times 100$ (S+D)/2

S ...

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
53	Laboratory control sample	cla,	0.103	0,090	601	601)-
7	Matrix spike sample		(SSR-SR) y C(C(529	Ьb	16	
7	Duplicate sample		1088	hbII	6	6	7

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#: 23/650

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	of
Reviewer:_	CZ.
2nd reviewer:_	1

	see qualifications belo <u>N/A</u> Have results <u>N/A</u> Are results w	od Sec Cover ow for all questions answ been reported and calculation the calibrated rangition limits below the CRO	ulated correctly? e of the instrument		e identified as "N/	A".				
Compo	Compound (analyte) results forreported with a positive detect were recalculated and verified using the following equation:									
Concent	Concentration = (Area +0.0004) (100 m/s)(0F) (0,07176+0,0004) (100 m/s)(5000) (0,07176+0,0004) (100 m/s)(5000) (0,0732) (web/solid) (1000) (0,9135) (0,0032) (10.19) (1000)									
#	Sample ID	Analyt	Reported Calculated Concentration Concentration Acceptable Analyte (Mg/Ks) (Mg/Ks) (Y/N)							
	\	C104		1200	1200	7				
	1.00									
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)	Α

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

VIII. Overall Assessment

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

IX. Field Duplicates

Samples 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:

	Concentrat	ion (mg/Kg)	- DDD	Difference		
Analyte	SSAJ2-05-5BPC_FD	SSAJ2-05-5BPC	RPD (Limits)	(Limits)	Flags	A or P
Perchlorate	3.4	7.2	72 (≤50)	-	J (all detects)	А

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)	А	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)	А	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 #:_	23000E0	
SDG #:_	280-4960-1	
Laborato	vrv: Test America	

	Date:_	8-3-	10
	Page:_	_\of	_
Rev	viewer:_	_CP	_
2nd Rev	viewer:_	5	

METHOD: (Analyte)	Perchlorate (EPA Method 314.0)	
, , , , , , , , , , , , , , , , , , , ,		

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 6/29/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
V	Duplicates	A	Dp.
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)
Х	Field blanks	NO	EB=5, FB=FB-0407201()-RZD (280-2216-2)
	ND		(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	1	<u>501</u>				
1	SSAJ2-05-1BPC	2	11	୭୯୬	21	31	
2	SSAJ2-05-5BPC/_FD		12	085	22	32	
3	SSAJ2-05-5BPC./		13		23	33	
4	SSAJ2-05-10BPC,**		14		24	34	
5	EB-06292010-RZD 🔽	J	15		25	35	
6	SSAJ2-05-1BPC/MS 5)	16		26	36	
7	SSAJ2-05-1BPC.MSD		17		27	37	
8	SSAJ2-05-1BPC. DUP	_	18		28	38	
9			19		29	39	
10			20		30	40	

23665E6W.wpd

Page: of 2
Reviewer: c2
2nd Reviewer:

Method: Inorganics (EPA Method See Cover)

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?	V			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		V		
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.	<u></u>	-		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		~		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.				
V. 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?	L		/	

LDC#: 23665£6

VALIDATION FINDINGS CHECKLIST

Page: 2 of Reviewer: 2 2nd Reviewer: 2

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 #:_ SDG#

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Reviewer: 2nd Reviewer:

METHOD: Inorganics, EPA Method_

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

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

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

of 4 or more, no action was taken.

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

N N/A W.

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

Qualifications	3/10 (m)												
	1/-C												
Associated Samp	HIS.1												
RPD (Limits)													
MSD %Recovery	7												
MS													
Analyte	C 10-4	-											
Matrix	30,1												
MS/MSD ID	6/1												
#													,

LDC#: 23665E6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

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

Inorganics, Method: See Cover

YN NA YN NA

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

	Concentrati	on (mg/Kg)					
Analyte	2	3	RPD (≤50)	Difference	Limits	Qualification (Parent only)	
Perchloratë	3.4	7.2	72			Jdet/A (fd)	

V:\FIELD DUPLICATES\FD_inorganic\23665E6.wpd

LDC#: 236554

Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: CZ

Method: Inorganics, Method __

0,470

71

was recalculated.Calibration date: 67110 The correlation coefficient (r) for the calibration of $\overline{\mathcal{CM}}$ An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

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

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	-	0.00284			
		s2	2.5	0.0077	0.999314	0.999358	
		s3	5	0.0154)-
	(84	10	0.03108			
	J ()	SS	20	0.06039			_
		9s	40	0.13055			
Calibration verification		R	0'92	900.Pl 0.05		-d5	
Calibration verification		0C J	20	70,54Y		201	
Calibration verification							7

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

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VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Reviewer: (72, 2nd Reviewer:

METHOD: Inorganics, Method See Cover

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

Where, %R = Found × 100

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

True = concentration of each analyte in the source.

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

S 0

Original sample concentration Duplicate sample concentration

Where, RPD = $|S-D| \times 100$ (S+D)/2

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (unite) mg/ks	True / D (units) my Kg	%R/RPD	%R/RPD	Acceptable (Y/N)
577	Laboratory control sample	ClOy	H80'0	Ø. (0)	87	87) -
9	Matrix spike sample		(SSR.SR)	0'29	0	_	
8	Duplicate sample	-	521	521	0	\bigcirc	

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# 2365 E6

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	CC
2nd reviewer.	h_

METH	HOD: Inorganics, Metho	d_See cover				
XN	N/A Are results w	ow for all questions and been reported and cal- ithin the calibrated ran- ion limits below the CF	culated correctly? ge of the instrument		e identified as "N/	A".
	ound (analyte) results f culated and verified usin		<u>C104</u>	repo	orted with a positi	ve detect were
Concei	ntration = , +0,0004)(F) 32)(%51/d)(V	(b)	calculation:	14+0.0004)(20)(100	mL) -3.
(6 ₀₀	32)(%solid)(V	UE)(1000)	calculation: (O,OS	916)(0,003	2)(103)(104	<u> </u>
#	Sample ID	Analy	/te	Reported Concentration (Malke)	Calculated Concentration (MOIC)	Acceptable (Y/N)
	4	Cloy		3.7	3.7	
						,
 						
		,				
	·					<u>.</u>
ļ						
						
<u> </u>	<u> </u>					
Note:				A STATE OF THE STA		