

LABORATORY DATA CONSULTANTS, INC.

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Northgate Environmental Management, Inc.

July 12, 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 June 25, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23456:

SDG#

280-3955-4

Fraction

280-2131-12, 280-2216-10, 280-2280-9 280-2301-9, 280-2400-12, 280-2448-14 280-2448-15, 280-2995-7, 280-3197-9 280-3264-8, 280-3624-5, 280-3679-7 280-3679-8, 280-3760-1, 280-3760-3 280-3955-1, 280-3955-2, 280-3955-3

Semivolatiles, Chlorinated Pesticides, Metals, Perchlorate

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

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

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

Sincerely,

Erlinda T. Rauto

Operations Manager/Senior Chemist

23456ST.wpd

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Attachment 1

DL 06/25/10

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

LDC #: 23456

SDG #: 280-2131-12, 280-2216-10, 280-2280-9, 280-2301-9,

280-2400-12, 280-2448-14, 280-2448-15, 280-2995-7

280-3197-9, 280-3264-8, 280-3624-5, 280-3679-7

<u>280-3679-8</u>, <u>280-3760-1</u>, <u>280-3760-3</u>, <u>280-3955-1</u>

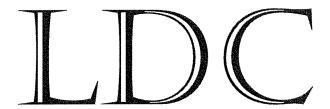
280-3955-2, 280-3955-3, 280-3955-4

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness	·			
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?		X		
If yes, were they corrected or documented for the client?			Х	See EDD_discrepancy_ form_LDC23456_070910.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23456

Semivolatiles



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 6, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3264-8

Sample Identification

SSAO3-02-3BPC

SSAO3-02-4BPC

SSAO3-02-3BPCMS

SSAO3-02-3BPCMSD

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
MB 280-16311/1-A	5/19/10	Bis(2-ethylhexyl)phthalate	88.5 ug/Kg	All samples in SDG 280-3264-8

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

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) were not within QC limits for one compound, the LCS percent recovery (%R) was within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Flag	A or P
SSAO3-02-3BPC	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 280-3264-8	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3264-8

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3264-8	SSAO3-02-3BPC	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)
280-3264-8	SSAO3-02-3BPC SSAO3-02-4BPC	All compounds reported below the PQL.	J (all detects)	Α	Project Quantitation Limit (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3264-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3264-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23456J2a	VALIDATION COMPLETENESS
SDG #: 280-3264-8	Stage 2B
Laboratory: Test America	_

Date:	7/08/10
Page:_	1 of
Reviewer:	W.
2nd Reviewer:	V

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

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

	Validation Area		Comments
1.	Technical holding times	Å	Sampling dates: 5/06/10
11.	GC/MS Instrument performance check	A	· ·
111.	Initial calibration	A	2 RSD r2 CON/104 & 25 3
IV.	Continuing calibration/ICV	A	CONTAN & 25 3
V.	Blanks	W2	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	ics
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SM	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	Ŋ	
XVII.	Field blanks	NÞ	FB = FB - 04072010-RZC (280-2280-2)

Note: A

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil

	201					
+ 1	SSAO3-02-3BPC	11	MB 280-16311/1-A	21	31	
∤ 2	SSAO3-02-4BPC	12		22	32	
3	SSAO3-02-3BPCMS	13		23	33	
4	SSAO3-02-3BPCMSD	14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	,

VALIDATION FINDINGS WORKSHEET

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

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	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	
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WW.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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VALIDATION FINDINGS WORKSHEET Blanks

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Page:	Reviewer:_	2nd Reviewer

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

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? N/A N N/A

Was a method blank analyzed for each concentration preparation level?

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

Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 5/4 / Blank analysis date: 6 /

	ation						
/	Sample Identification						
K							
Associated Samples:							
Associat		-	(4800))			
	Blank ID	Mb 286-1	88.5				
Colic. units: 49 /80	Compound		<i>343</i>				
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sis date:

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

5x Phthalates 2x all others

SDG#: Sec Cony

VALIDATION FINDINGS WORKSHEET Matrix Spike Duplicates

Page: 1 of 1 Reviewer: 3\[\rangle \]
2nd Reviewer: 1

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

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

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.

N/A

AN NA

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?

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Qualifications	No mal	(105 in + grand	cong. > 44 Spit														
Associated Samples																	
RPD (Limits)	()	()	()	()	()	()	()	(()	()	(()	()	()	()	()	()
MSD %R (Limits)	192 (51-120)	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()
MS %R (Limits)	353 (51-120)	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()
Compound	SS																
DI OSW/SW	3/4	,															
# Date																	

A. Phenol 26-90% < 35%		Compound	QC Limits (Soll)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)
25-102% < 50% 27-123% < 40% II. 4-Nitrophenol 11-114% < 50% 10-80% 28-104% < 27%	Ą	Phenol	76-90%	< 35%	12-110%	< 42%		Acenaphthene	31-137%	< 19%	46-118%	<31%
28-104% < 27% 36-97% < 28% KK. 2,4-Dinitrotoluene 28-89% < 47% 24-96% ne 41-126% < 38% TT. Pentachlorophenol 17-109% < 47% 9-103% 38-107% < 23% 39-98% < 28% ZZ. Pyrene 35-142% < 36% 26-127% 26-103% < 33% < 23-97% < 42% < 42% < 42% < 42%	ij	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	=	4-Nitrophenol	11-114%	< 50%	10-80%	× 50%
le 41-126% < 38% 41-116% < 38% TT. Pentachlorophenol 17-109% < 47% 9-103% 38-107% < 23%	шi	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	K.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	× 38%
38-107% < 23% 39-98% < 28% ZZ. Pyrene 35-142% < 36% 26-127% 26-103% < 33% 23-97% < 42%	j	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ë.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
26-103% < 33% 23-97% < 42%	œ	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	72.	Pyrene	35-142%	× 36%	26-127%	< 31%
	>	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

LDC#: 23 456 Jaa SDG #: 50 Care

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

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". Y N MIA

Y N 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?

*	Date	Sample ID	Finding	Associated Samples	Qualifications
			666 HHH NNHS0	unresolved peaks	J/15/ (3)
			-	,	
	-				

Comments: See sample calculation verification worksheet for recalculations

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 19, 2010

LDC Report Date:

July 9, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3760-1

Sample Identification

SSAO4-04-11BPC**

SSAI2-02-11BPC

SSAK7-02-12BPC

SSAM3-02-11BPC**

SSAM3-02-11BPC FD

RSAI2-15BPC

RSAI3-16BPC**

SSAM3-02-11BPCMS

SSAM3-02-11BPCMSD

^{**}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 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 280-16736/1-A	5/24/10	Bis(2-ethylhexyl)phthalate	76.3 ug/Kg	All samples in SDG 280-3760-1

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
SSAO4-04-11BPC**	Bis(2-ethylhexyl)phthalate	86 ug/Kg	86U ug/Kg
SSAI2-02-11BPC	Bis(2-ethylhexyl)phthalate	90 ug/Kg	90U ug/Kg
SSAK7-02-12BPC	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
RSAI3-16BPC**	Bis(2-ethylhexyl)phthalate	85 ug/Kg	85U ug/Kg

Samples FB-04072010-RZC (from SDG 280-2280-2), FB-04072010-RZD (from SDG 280-2216-2), and FB-04132010-RIG2-RZE (from SDG 280-2400-2) 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	SSAI2-02-11BPC SSAK7-02-12BPC RSAI2-15BPC RSAI3-16BPC**
FB-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	SSAM3-02-11BPC** SSAM3-02-11BPC_FD

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MSD percent recovery (%R) was not within QC limits for one compound, the MS percent recovery (%R) was within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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 280-3760-1	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 SSAM3-02-11BPC** and SSAM3-02-11BPC_FD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	555	D .//		
Compound	SSAM3-02-11BPC**	SSAM3-02-11BPC_FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Dimethylphthalate	31	56	-	25 (≤350)	-	_
Hexachlorobenzene	1300	1700	-	400 (≤350)	J (all detects)	А

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3760-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3760-1	SSAO4-04-11BPC** SSAI2-02-11BPC SSAK7-02-12BPC SSAM3-02-11BPC** SSAM3-02-11BPC_FD RSAI2-15BPC RSAI3-16BPC**	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)
280-3760-1	SSAM3-02-11BPC** SSAM3-02-11BPC_FD	Hexachlorobenzene	J (all detects)	А	Field duplicates (Difference) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 280-3760-1

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
280-3760-1	SSAO4-04-11BPC**	Bis(2-ethylhexyl)phthalate	86U ug/Kg	А	bl
280-3760-1	SSAI2-02-11BPC	Bis(2-ethylhexyl)phthalate	90U ug/Kg	Α	bl
280-3760-1	SSAK7-02-12BPC	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
280-3760-1	RSAI3-16BPC**	Bis(2-ethylhexyl)phthalate	85U ug/Kg	Α	bl

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3760-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:	23456N2a	_ VALIDATION COMPLETENESS WORKSHEET
SDG #:_	280-3760-1	_ Stage 2B/4
ahorato	nr. Test America	

Date:7/02/10 Page: \of / Reviewer: 0V3 2nd Reviewer:

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 5 /a /to
II.	GC/MS Instrument performance check	A	
111.	Initial calibration	A	2 RED 12 CON /101 £ 25 }
IV.	Continuing calibration/ICV	A	COM /10 4253
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	us
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)	H	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 4.5
KVII.	Field blanks	SM	$F3 = F8 - 04072010 - RZC \qquad (280 - 2288 - 2)$ $= F8 - 04072010 - RZD \qquad (280 - 2216 - 2)$ $= F8 - 04132010 - RIG2 - RZE \qquad (280 - 2400 - 2)$

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

₹ND = No compounds detected D = Duplicate

R = Rinsate

TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

7	0	1	
		-	٠

	4011					
1	SSAO4-04-11BPC**	† 11	MB 280 - 16736 K-A	21	31	
2	SSAI2-02-11BPC	12		22	32	
3	SSAK7-02-12BPC	13		23	33	
4	SSAM3-02-11BPC**)	14		24	34	
5	SSAM3-02-11BPC_FD 5	15		25	35	
6	RSAI2-15BPC	16		26	36	
7	RSAM3-16BPC**	17		27	37	
8	SSAM3-02-11BPCMS	18		28	38	
9	SSAM3-02-11BPCMSD	19		29	39	
10		20		30	40	

LDC #:	23456	129
SDG #:_	See Cover	

VALIDATION FINDINGS CHECKLIST

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		F		
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?				
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	_			
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?				
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?				
V. Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
VI. Surrogate spikes		ı		The control of the co
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?	•		1	
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	L			
Was an LCS analyzed for this SDG?	Δ			

LDC #: 23 456 N 29 SDG #: Sce Cover

VALIDATION FINDINGS CHECKLIST

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

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				197, 17, 18, 18, 18, 18, 18, 18, 18, 18, 18, 18
Were performance evaluation (PE) samples performed?		1		
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internal standards				A PART OF THE PART
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				AND THE STATE OF T
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)	jā š			ng sa Jesus (1994) and a same of the same
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?			7	
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				#Claure #71 / 2015 19 19 19 19 19 19 19 19 19 19 19 19 19
System performance was found to be acceptable.				
XV. Overall assessment of data				The state of the s
Overall assessment of data was found to be acceptable.	7		T	
XVI. Field duplicates				The second of th
Field duplicate pairs were identified in this SDG.		,		
Target compounds were detected in the field duplicates.	7			
XVII. Field blanks				
Field blanks were identified in this SDG.	7			
Target compounds were detected in the field blanks.	1			

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.

West.

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DC#:	 } }

VALIDATION FINDINGS WORKSHEET Blanks

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Tage.	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".

Y N N/A

Was a method blank analyzed for each matrix?

Was a method blank analyzed for each concentration preparation level?

Y/N N/A Was a method blank associated with every sample? Y/N N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $\frac{5}{4}$ / $\frac{1}{4}$ 0 Blank analysis date: $\frac{5}{4}$ / $\frac{1}{4}$ 0 Y N N/A

Sample Identification **X** 7 2 1 Associated Samples: 4 ွ 38 MB 280-16736 Blank ID 111 Compound Conc. units:

Blank analysis date: Blank extraction date:_ Conc. units:

Associated Samples:

Compound	Blank ID	Sample Identification	cation	

5x Phthalates 2x all others

LDC#23456 N 2A SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: lof_ 2nd Reviewer: Reviewer:

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

Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Up /L Associated sample units: U_5 /L Associated units: U_5 /L A Blank units: Y N N/A

Sampling date:

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

W o,

Sample Identification Associated Samples: γ FB-04072010-82D Blank ID 2.7 群 Compound CROL

Associated sample units: 16 1/ Blank units: "4 /L

Sampling date: # /19/10
Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples:

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FB-04132		
	FB-04132010-RIG2-RZE	
EtE 1.		
9 1 = = + + + 1		
CROL		

5x Phthalates 2x All others

LDC# 23456 AZ SDG #: Sc Corr

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

₫ 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"

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 N N/A

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? Was a MS/MSD analyzed every 20 samples of each matrix?

MS/MSD. Soil / Water. Y N N/A

	П	Т		Г		Г		Π	Γ	T	Г		Γ	Ī	Ī	Γ	Г
Qualifications	No such	(AC 5:															
Associated Samples	7																
RPD (Limits)	()	()	(()	()	,	()	()	(()	()	()	()	()	()	()	1
MSD %R (Limits)	159 (51-120)	()	()	()	()	,	()	()	()	()	()	()	()	()	()	()	,
MS %R (Limits)	()	()	()	()	()		()	()	()	()	()	()	()	()	()	()	()
Compound	55																
MS/MSD ID	<i>b/</i> 8	, ,															
Date																	
#																	

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)
Ą	Phenol	26-90%	< 35%	12-110%	< 42%	99	Acenaphthene	31-137%	≥ 19%	46-118%	< 31%
ci	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	11.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
ші	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	χ Έ	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	× 38%
j	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	Ξ.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
œ	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	.72	Pyrene	35-142%	×9e >	26-127%	< 31%
>	4-Chloro-3-methylphenot	26-103%	%EE >	23-97%	< 42%						

LDC #:	23450	, W29
SDG #:	Sac	

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	_of
Reviewer:	Nb
2nd reviewer:	$i \sim$

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

Y	N,	N/A
	M	N/A

	Concentrat	ion (vg/kg)	
Compound	4	5	RPD
	3/	56	25 (= 3500)
CC SS	1300	1700	400 J dets
	Concentrati	ion (
Compound			RPD
·			
			4
	Concentrati	ion (
Compound			RPD
Compound			
	Concentrati		
	Concentrati	T T	
Compound			RPD
			.,

SDG#: Su Con

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: of / 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
C_x = Concentration of compound,
S= Standard deviation of the RRFs,

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

X = Mean of the RRFs

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

#

Recalculated %RSD 10.72 5.53 5.14 8.92 3.95 10.07 Reported %RSD 8.9 10.7 10.1 5.5 4.0 5.1 Average RRF Recalculated 1.1295 (Initial) 0.5907 1.3831 0.2667 1.0634 1.0547 Average RRF Reported 0.5907 1.1295 1.3831 1.0634 (Initial) 0.2667 1.0547 Recalculated 50 std) 1.0956 0.2458 0.9188 0.5875 1.3137 RRF Reported (50 std) 0.5875 0.2458 1.0956 0.9188 1.3137 RRF (181) (IS2) (184) (185) (186) Compound (Internal Standard) Benzo(g,h,i)perylene Hexachlorobenzene Naphthalene 1,4-Dioxane Chrysene Fluorene 5/15/2010 Calibration Standard ID MSS D ICAL

Area IS	248451	917747	611156	1050872	1366378	1219193	
Area cpd	182457	1256837	1003602	322935	1758196	1400291	
nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20	

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6254	1.1173	1.3104		1.0916	0.9654
10.00	0.5976	1.0486	1.2167	0.2356	1.0440	0.9882
20.00	0.5589	1.0624	1.2573	0.2390	0.9996	1.0011
50.00	0.5875	1.0956	1.3137	0.2458	1.0294	0.9188
80.00	0.6157	1.1498	1.4448	0.2662	1.1159	1.1277
120.00	0.6243	1.1713	1.4872	0.2861	1.1093	1.1722
160.00	0.5838	1.1804	1.4852	0.2808	1.0820	1.0483
200.00	0.5324	1.2102	1.5498	0.3131	1.0357	1.2160
×	0.5907	1.1295	1.3831	0.2667	1.0634	1.0547
S	0.0327	0.0581	0.1233	0.0286	0.0420	0.1062

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.

SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page lof Reviewer._ 2nd Reviewer:

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

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

Where:

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

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

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

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	Date	Compound (Reference IS)		(Initial RRF)	(CC RRF)	(CC RRF)	%D	Q%
-	D5356	05/26/10	1,4-Dioxane (IS	(IS1)	0.5907	0.5990	0.5990	1.4	1.4
				(185)	1.1295	1.1875	1.1875	5.1	5.1
			Fluorene (IS	(183)	1.3831	1.4633	1.4633	5.8	5.8
			Hexachlorobenzene (IS	(184)	0.2667	0.2639	0.2639	1.0	1.0
				(185)	1.0634	1.1004	1.1004	3.5	3.5
			i)perylene,	(981)	1.0547	1.1486	1.1486	8.9	8.9

Compound (Reference IS)	S)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	399284	333295
Naphthalene	(182)	40/80	2884879	1214655
Fluorene	(183)	40/80	2507061	856625
Hexachlorobenzene	(IS4)	40/80	781527	1480517
Chrysene	(185)	40/80	4117195	1870721
Benzo(g,h,i)perylene	(186)	40/80	3709731	1614960

7

LDC#: 23456 N2a SDG#: <u>Ste Cover</u>

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:_	lof_1_
Reviewer:	W
2nd reviewer:	12

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: #

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	86.56	87	87	6
2-Fluorobiphenyl		79.97	80	80	
Terphenyl-d14	J	97.07	97	97	1
Phenol-d5			,		
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

ample ID:

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

Sample ID:

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

LDC # 20456 N2a SDG #: See Cover

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: Lof 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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Sample concentation

MSDC = Matrix spike duplicate concentration

MS/MSD samples:

MSC = Matrix spike concentration

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

	ďS	ike	Sample	Spiked ;	Sample	Matrix Spike	Spike	Matrix Spike Duplicate	P. Duplicate	GSW/SW	ds
Compound	(67./	Added (45 /E)	Concentration $(\frac{1}{16}\sqrt{\frac{1}{16}})$	Concentration $(\mathcal{V}_{\mathcal{S}}/\mathcal{E}_{\mathcal{A}})$	tration	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
	MS	0 MSD	0	MS	MSD	Reported	Rorale	Domonton		11	
Phenol									Kecaic	Keported	Kecalculated
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0180	2840	0	2/80	2340	28	28	87	82	^	7
Pentachlorophenol											
Pyrene	2810	28.40	\	25.10	2700	89	69	100	26	7	^
										,	

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# 2>456 N2a SDG #: See Concr

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

7 Reviewer._

Page: 1 of 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 duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

16736 BA 280-

<u></u>	1		J	1	1	\downarrow	Ť	T	<u> </u>		T		
I CS/I CSD	RPD	Legalisation	Net auc mareo										
1 CS/I	18	Donorfod											
Q.	ecovery	Porale											
USD I	Percent Recovery	Reported											
SU	Recovery	Recalc				77		11					
) I	Percent Recovery	Reported				77		77					
ike	Conceptration (45/k~)	l CSD				茶	~						
ds	Conce	I CS				1860		2661					
ike	Added (ug/k)	<i>O</i> I CSD				KA		P					
S.	Ad (ug	SDT				2590		3590					
	Compound		Phenol	N-Nitroso-di-n-propylamine	4-Chloro-3-methylphenol	Acenaphthene	Pentachlorophenol	Pyrene					

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#: 23456 N29 SDG#: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u>l of 1</u>
Reviewer:_	W
2nd reviewer:	5

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

	Y	Ν	N/A
(-	Y/	Ŋ	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?

			1
Conce	entratio	on = <u>(A,)(I,)(V,)(DF)(2.0)</u> (A _x)(RRF)(V _x)(V _x)(%S)	Example:
٨			# 7 Cc
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. 47 / , 33:
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	
l _s	=	Amount of internal standard added in nanograms (ng)	Conc. = $\frac{(72003)(40)(1m/)(1000)(}{(1200263)(0.2667)(30.69)(0.891)(}$
V_{o}	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	1200263 0.266/ N.69 NO.89/ N
V_i	=	Volume of extract injected in microliters (ul)	= 329.498
V_{t}	=	Volume of the concentrated extract in microliters (ul)	
Df	=	Dilution Factor.	2 330ng /c
%S	=	Percent solids, applicable to soil and solid matrices only	/

2.0	= Factor of 2 to accou	int for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
-					
 					
					
 -					
 					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 19, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3760-3

Sample Identification

SSAK7-02-14BPC** SSAM3-02-12BPC

^{**}Indicates sample underwent Stage 4 review

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

Method Blank ID Extraction Date		Compound TIC (RT in minutes)	Concentration	Associated Samples	
MB 280-17862/1-A	6/2/10	Bis(2-ethylhexyl)phthalate	77.9 ug/Kg	All samples in SDG 280-3760-3	

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

Samples FB-04072010-RZD (from SDG 280-2216-2) and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No 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	SSAK7-02-14BPC**
FB-04132010-RIG2-RZE	4/13/10	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	1.1 ug/L 1.6 ug/L	SSAM3-02-12BPC

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria 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 280-3760-3	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3760-3

SDG Sample		Compound	Flag	A or P	Reason (Code)	
280-3760-3	SSAK7-02-14BPC** SSAM3-02-12BPC	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 280-3760-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3760-3

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 23456O2a Stage 2B/4 SDG #: 280-3760-3 Laboratory: Test America

Date:	7/08/10	
Page:_	1 of 1	
Reviewer:	JVV	
2nd Reviewer:		-

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 5 ha 10
11.	GC/MS Instrument performance check	4	
111.	Initial calibration	Δ	2 RED YY
IV.	Continuing calibration/ICV	A	2 RED VY CW/14 = 252
V.	Blanks	s W	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	Client Spec LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	Å	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	1	
XVI.	Field duplicates	N	
XVII.	Field blanks	5w	FB = FB - 0 4072010 - RZD (280 - 2216->) J = FB - 0 4132016 - RIG2 - RZE (280 - 2400-2)

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

** Indicates sample underwent Stage 4 validation

	Sø'\				
1+	SSAK7-02-14BPC**	11	21	31	
2	SSAM3-02-12BPC	12	22	32	
2 3 t	MB 280-17862/1-A	13	23	33	
4	/	14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

LDC #:	23456	020
SDG#:	See Cover	

VALIDATION FINDINGS CHECKLIST

Page:_	1 of 2
Reviewer:	384
2nd Reviewer:	\sim

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SVV 846 Method 8270C)	,	į		
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	-			
All technical holding times were met.				
Cooler temperature criteria was met. II. GC/MS Instrument performance check				Maria de la compania del compania de la compania de la compania del compania de la compania del compania de la compania de la compania del co
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		ı		
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		4		
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	- 1		T	100 miles
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			Т	
Was an LCS analyzed for this SDG?				

LDC #: 23456 0 29 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	<	<u> </u>		
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		ı		
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			172	
Were relative retention times (RRT's) within \pm 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				:
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)				and the second of the second o
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		7.3		
System performance was found to be acceptable.	7			
KV. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
KVI. Field duplicates				And the second s
Field duplicate pairs were identified in this SDG.		7	-	
Target compounds were detected in the field duplicates.			1	'
KVII. Field blanks				
Field blanks were identified in this SDG.				
arget compounds were detected in the field blanks.	1			

VALIDATION FINDINGS WORKSHEET

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

	100 Marie 100 Ma			
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	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	111.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	חחח
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	WV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

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

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)C #:	# 5

VALIDATION FINDINGS WORKSHEET Blanks

	26	1
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 concentration preparation level? Was a method blank associated with every sample? Was a method blank analyzed for each matrix?

Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 6/62 1/10 Blank analysis date: 6/4/10 WN N/A

Sample Identification = Associated Samples: MB 280-17 862, Blank ID 77.9 七七七 Compound Conc. units: 49

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Blank analysis date:	
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Blank extraction date:	Conc. ul

Associated Samples:	Blank ID					
Conc. units:	Compound	,				

5x Phthalates 2x all others

LDC #: 23456 0 2a 25 SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

lof	36	1
Page:	Reviewer:	2nd Reviewer:

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

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

Were field blanks identified in the field blanks?

Were target compounds detected in the field blanks?

Blank units: 4 /6 / 10 Sampling date: 4 /67 /10 Sampling date: 4 /67 /10 Field Blank | Rinsate / Other.

(PA)						
	ation					
Samples:	Sample Identification					
Associated Samples:						
Other:						
ok/ Rinsate /		PB-04672010-RZD				
ne)(Field Blar	Blank ID	PB-04672	γ.			
/pe: (circle or	Compound		<u> </u>			
Field blank type: (circle one)(Field Blank) Rinsate / Other:	Сош					CROL

Associated sample units: 15 /kg Blank units: 45 1

Sampling date:_

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

Associated Samples:

2

Sample Identification FB-04132610-RIG2-RZE Blank 1D <u>ہ</u> __ キャア THE THE Compound CRaL

5x Phthalates 2x All others

SDG #: 2345 6 029

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of /

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)

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

X = Mean of the RRFs

Recalculated

%RSD

10.72

3.95

5.53

8.92

		_	$\overline{}$			_	-		_
Reported	%RSD		5.5	5.1	8.9	10.7	4.0	10.1	
Recalculated	Average RRF	(Initial)	0.5907	1.1295	1.3831	0.2667	1.0634	1.0547	
Reported	Average RRF	(Initial)	0.5907	1.1295	1.3831	0.2667	1.0634	1.0547	
Recalculated	RRF	(50 std)	0.5875	1.0956	1.3137	0.2458	1.0294	0.9188	
Reported	RRF	(50 std)	0.5875	1.0956	1.3137	0.2458	1.0294	0.9188	
		Standard)	(IS1)	(IS2)	(183)	(184)	(185)	(186)	
		Compound (Internal Standard)	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorobenzene	Chrysene	Benzo(g,h,i)perylene	
	Calibration	Date	5/15/2010						
		Standard ID	ICAL	MSS D					
		#	-						

Area IS	248451	917747	611156	1050872	1366378	1219193	
Area cpd	182457	1256837	1003602	322935	1758196	1400291	
nc IS/Cpd	40/20	40/20	40/20	40/20	40/20	40/20	

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(g,h,i)per
4.00	0.6254	1.1173	1.3104		1.0916	0.9654
10.00	0.5976	1.0486	1.2167	0.2356	1.0440	0.9882
20.00	0.5589	1.0624	1.2573	0.2390	9666.0	1.0011
50.00	0.5875	1.0956	1.3137	0.2458	1.0294	0.9188
80.00	0.6157	1.1498	1.4448	0.2662	1.1159	1.1277
120.00	0.6243	1.1713	1.4872	0.2861	1.1093	1.1722
160.00	0.5838	1.1804	1.4852	0.2808	1.0820	1.0483
200.00	0.5324	1.2102	1.5498	0.3131	1.0357	1.2160
×	0.5907	1.1295	1.3831	0.2667	1.0634	1.0547
S	0.0327	0.0581	0.1233	0.0286	0.0420	0.1062
_						

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.

SDG # 23 456 026

VALIDATION FINDINGS WORSHEET Continuing Calibration Results Verification

Page 1 of 1 Reviewer: 006 2nd Reviewer: 1

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

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

Where:

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

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

ave. RRF = initial calibration average RRF Ax = Area of compound

Cx = Concentration of compound

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

		Calibration		Average RRF	Reported	Recalculated	Reported	Recalcula
#	Standard ID	Date	Compound (Reference IS)	(Initial RRF)	(CC RRF)	(CC RRF)	Q%	Q%
-	D5625	06/11/10	1,4-Dioxane (IS1)	0.5907	0.7159	0.7159	21.2	21.2
e.			Naphthalene (iS2)	1.1295	1.1633	1.1633	3.0	3.0
			Fluorene (IS3)	1.3831	1.3722	1.3722	8.0	0.8
			Hexachlorobenzene (iS4)	0.2667	0.2394	0.2394	10.2	10.2
			Chrysene (IS5)	1.0634	1.0645	1.0645	1.0	0.1
			Benzo(g,h,i)perylene (IS6)	1.0547	1.1306	1.1306	7.2	7.2

Compound (Reference IS)	ls)	Concentration	Area Cpd	Area IS
		(IS/Cpd)		
1,4-Dioxane	(IS1)	40/80	408644	285411
Naphthalene	(182)	40/80	2393566	1028810
Fluorene	(153)	40/80	1958156	713493
Hexachlorobenzene	(1S4)	40/80	603501	1260517
Chrysene	(185)	40/80	3227671	1516033
Benzo(g,h,i)perylene	(186)	40/80	2853120	1261802

LDC#:_	23	456	029
SDG #:_	Sre	Cov	er

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof_1_
Reviewer:	No
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

Sample ID:_

SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	76.3	76	74	0
2-Fluorobiphenyl		72.1	72	ファ	
Terphenyl-d14	<i>-</i>	86.6	87	87	8
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					

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					

22456029 SDG #: See Cover LDC #:

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

76 Page: lof 1 2nd Reviewer:_____ Reviewer:_

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

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

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

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

LCS/LCSD samples:

LCS 280- 17862

	Š	oike	Ş	Spike		CS	01	l CSD	USD I/SD I	CSD
Compound	A (1/9)	Added (Vg/k_)	Concentrat	Concentration (Mg/た)	Percent Recovery	Зесо чегу	Percent Recovery	Recovery	RPD	٥
	S I	l CSD	l Cs	I GSD	Reported	Recalc	Reported	Docala	Donortod	Doorland
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2550	MA	1830	Z	77	77				
Pentachiorophenol										
Pyrene	2850	1	०१०र	_	8	8				

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. 300

LDC #: 33456 02 9 SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	lof1_
Reviewer:	SVC
2nd reviewer:	

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

R	N	N/A
∇	N	N/A

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

 $\begin{array}{rcl} \text{Concentration} &=& \underline{(A_{.)}(I_{\circ})(V_{.)}(DF)(2.0)} \\ && (A_{is})(RRF)(V_{\circ})(V_{i})(\%S) \\ A_{\star} &=& \text{Area of the characteristic} \end{array}$

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

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

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

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

V_i = Volume of extract injected in microliters (ul)

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

Df = Dilution Factor.

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

Example:

Conc. = $\frac{(7668)(40)(1ml)()}{(118547)(0.2667)(31.29)(0.532)()}$

= 33,3

2 33 ng /leg

2.0	= Factor of 2 to accou	nt for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
 					
					
<u> </u>					
				·	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 25, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Semivolatiles

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3955-2

Sample Identification

SSAR3-01-1BPC

SSAR3-01-5BPC**

SSAR3-01-5BPCMS

SSAR3-01-5BPCMSD

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

V. Blanks

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

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

Field Blank ID	Sampling Date Compound		Concentration	Associated Samples	
FB-04062010-RZB	4/6/10	Bis(2-ethylhexyl)phthalate	2.7 ug/L	All samples in SDG 280-3955-2	

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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
SSAR3-01-1BPC SSAR3-01-5BPC**	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 280-3955-2	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Data Qualification Summary - SDG 280-3955-2

SDG	Sample	Compound	Flag		Reason (Code)
280-3955-2	SSAR3-01-1BPC SSAR3-01-5BPC**	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)
280-3955-2	SSAR3-01-1BPC SSAR3-01-5BPC**	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 280-3955-2

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Semivolatiles - Field Blank Data Qualification Summary - SDG 280-3955-2

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:	23456Q2a	 VALIDATION COMPLETE
SDG #:	280-3955-2	Stage 2E
Laborato	ry: Test America	

Date:	7/08/10
Page:_	_of/_
Reviewer:	04
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: 5/25 /10
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	r esp r~
IV.	Continuing calibration/ICV	A	COV /W = 25 }
V.	Blanks	<u> </u>	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	<u> </u>	κς
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Stage 2B validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	Ą	
XVI.	Field duplicates	N	
XVII.	Field blanks	SN	FB = FB04062010 - RZB (280_2131-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples ** Indicates sample underwent Stage 4 validation

vanue	Soi				
1	SSAR3-01-1BPC	11	21	31	
2	SSAR3-01-5BPC**	12	22	32	
3	SSAR3-01-5BPCMS	13	23	33	444
4	SSAR3-01-5BPCMSD	14	24	34	
5	MB 280-17556/1-A	15	25	35	
6	,	16	26	36	
7		17	27	37	
8	-	18	28	38	
9		19	29	39	
10		20	30	40	

LDC #:_	03456	Q	29
SDG #:	See Cover	•	-

VALIDATION FINDINGS CHECKLIST

Method: Semivolatiles (EPA SW 846 Method 8270C)

Velidation Asso	T.,	T	T	
Validation Area I. Technical holding times	Yes	<u>No</u>	NA	Findings/Comments
All technical holding times were met.		-		
Cooler temperature criteria was met.	1			
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		I-		
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	_			
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?				
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/	Ť		
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				The state of the s
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?			1	
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		é		
Was an LCS analyzed for this SDG?	1			

LDC #: 23456 Q 29 SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1/7,
2nd Reviewer: 1/7

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 CONTRACTOR OF THE PARTY OF TH
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				and the second s
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	(
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<u></u>			
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs	ı			
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TiCs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			\	
Were relative intensities of the major ions within \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				The state of the s
System performance was found to be acceptable.				
(V Overall assessment of data ii				gille service and the service
Overall assessment of data was found to be acceptable.				
KM: Field duplicates				And the second of the second o
Field duplicate pairs were identified in this SDG.		/		
arget compounds were detected in the field duplicates.			7	
VII. Field blanks			7	
ield blanks were identified in this SDG.	1	,		
arget compounds were detected in the field blanks.		ě		

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**	W. 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*⁴	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. Butyibenzyiphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-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	TIT.
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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2	7
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#	#:
LDC	SDG

VALIDATION FINDINGS WORKSHEET Field Blanks

lof 30g	7
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 fjeld blanks? X N N/A Blank units:

Ly /L Associated sample units: 45 Sampling date: _

Sampling date: 4 66 / 16 Field blank / Rinsate / Other: Field blank type: (circle one)

<u>_</u> + Sample Identification Associated Samples: T FB64062010-82B Blank ID 2.7 铝 Compound CROL

Associated sample units: Blank units:

Sampling date: Field Blank / Rinsate / Other:

Associated Samples:

tore status of the control of the prairie of the control of the co	וכיו וכום בומוויי	/ Misale / Ouici.	Associated Salliples.	samples:		
Compound	Blank ID		3	Sample Identification		
1000						
CRQL						

5x Phthalates 2x All others

23456 924 SDG #: LDC#:

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

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". Y N 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? Y/N, N/A

	(4)	6								
Qualifications	J/W 4	1								
Associated Samples	ed produ									
Finding	666 HHH UNITESTIMED protes	L								
Sample ID	λ _									
Date					-					
*										

Comments: See sample calculation verification worksheet for recalculations

PC #34CE & 29 SDG#:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page:

2nd Reviewer: Reviewer:

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

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

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

average RRF = sum of the RRFs/number of standards

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

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

X = Mean of the RRFs

%RSD = 100 * (S/X)

			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	5/26/2010	5/26/2010 1,4-Dioxane (IS1)	0.5027	0.5027	0.5263	0.5263	3.1	3.06
MSS K		Naphthalene (IS2)	1.0468	1.0468	1.0463	1.0463	3.3	3.31
		Fluorene (IS3)	1.3121	1.3121	1.3164	1.3164	3.6	3.62
		Hexachlorobenzene (IS4)	0.2331	0.2331	0.2374	0.2374	5.3	5.33
		Chrysene (IS5)	1.0301	1.0301	1.0388	1.0389	3.6	3.62
		Benzo(a)pyrene (IS6)	1.0993	1.0993	1.0967	1.0967	7.1	7.15

_							
	Area IS	266078	1022206	609236	1011668	1057674	887232
	Area cpd	167190	1337516	92266	294751	1361944	1219171
	nc IS/Cpd	40/20	40/50	40/20	40/50	40/50	40/50

Conc	1,4-Dioxane	Naphthalene	Fluorene	Hexachlorob	Chrysene	Benzo(a)py
4.00	0.5549	1.0427	1.2674		1.0923	0.9816
10.00	0.5146	1.0144	1.2648	0.2205	1.0307	1.0205
20.00	0.5157	0.9915	1.2629	0.2208	1.0261	1.0189
50.00	0.5027	1.0468	1.3121	0.2331	1.0301	1.0993
80.00	0.5345	1.1001	1.3820	0.2491	1.0906	1.1725
120.00	0.5242	1.0841	1.3704	0.2478	1.0442	1.1631
160.00	0.5263	1.0499	1.3364	0.2478	1.0176	1.1562
200.00	0.5373	1.0411	1.3352	0.2426	0.9792	1.1613
×	0.5263	1.0463	1.3164	0.2374	1.0389	1.0967
S	0.0161	0.0346	0.0477	0.0126	0.0376	0.0784

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.

23 460 Bra LDC # 7 114 SDG # See Cover

Continuing Calibration Results Verification VALIDATION FINDINGS WORSHEET

Page_ Reviewer: 2nd Reviewer:

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

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

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

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

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound

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

	2	Calibration	3	á	Average RRF	Reported	Recalculated	Reported	Recalculated	
	K4303	Date 06/02/10	Compound (Relefence IS)	(IS1)	(initial RRF) 0.5263	(UU RRF) 0.5127	0.5127	2.6	2.6	
			Naphthalene	(182)	1.0463	1.1269	1.1269	7.7	7.7	
			Fluorene	(183)	1.3164	1.4475	1.4475	10.0	10.0	
			Hexachlorobenzene	(184)	0.2374	0.2516	0.2516	6.0	6.0	
			Chrysene	(185)	1.0388	1.1248	1.1248	3.0	8.3	
			Benzo(a)pyrene	(186)	1.0967	1.2328	1.2328	12.4	12.4	
r										

		ccv1		CCV2		
Compound (Reference IS)	S)	Concentration (IS/Cpd)	Area Cpd	Area IS	Area Cpd	Area IS
1,4-Dioxane	(IS1)	40/80	245508	239426		
Naphthalene	(182)	40/80	2057095	912731		
Fluorene	(183)	40/80	1605716	554661		
Hexachlorobenzene	(184)	40/80	462548	919235		
Chrysene	(185)	40/80	2265596	1007071		
Benzo(a)pyrene	(186)	40/80	1977238	801930		

LDC#: 3456 Q 29 SDG#: Ste Cover

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:	<u>lof_1</u>
Reviewer:_	N
2nd reviewer:_	1/

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

Sample ID:

SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	100	74.9	75	75	0
2-Fluorobiphenyl		71.8	72	フン	
Terphenyl-d14	V	84.7	87	87	J
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					

Sample ID:

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

22456 Q 29 SDG #: See Cover LDC #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: 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

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

SSC = Spiked sample concentration SA = Spike added

MSDC = Matrix spike duplicate concentration

MS/MSD samples:

MSC = Matrix spike concentration

	Spi	ike	Sample	Spiked	Sample	Matrix Spike	Spike	Matrix Spike Duplicate	- Duplicate	USW/SW	SD
Compound	Added (Work)		Concentration (Concei (14 _{C /}	Concentration $(u_{\mathcal{C}}/\mathcal{E}_{\mathcal{V}})$	Percent Recovery	ecovery	Percent Recovery	ecovery	QAY	
	MS	/ MSD	2	MS	/ MSD	Reported	Recalc.	Reported	Recalc	Reported	Recalculated
Phenoi											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	2900	0L8c	Q	199)	2881	29	29	99	7 9		-
Pentachlorophenol	•)			X		
Pyrene	20 62	0232	84	2/30	27.20	2	R	7	71	2	2
						•					

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

LDC#: 23456 Q29 SDG #: See Corer

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

Page: lof 1 Reviewer:_

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)

PES 280- 17556 LCS/LCSD samples:

	S	pike	S	Spike]	CS.	31	l CSD	US3 I/S3 I	Cen
Compound		Added $(-\frac{1}{16}/\frac{1}{2})$	Conce	Concentration $(\frac{1}{2} \frac{1}{2} \frac{1}{2} $	Percent Recovery	Recovery	Percent I	Percent Recovery	RPD	٥
	SOI	o I CSD	SD I	1080	Reported	Recalc	Poportod	Donala	Donog	7
Phenoi									oan oan	versuculaired
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	2410	4X	1790	\$	73	73				
Pentachlorophenol										
Pyrene	2460	→	084	_	7	72				
								· · · · · · · · · · · · · · · · · · ·		

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 #:	234	56	Q	29
SDG #:_9	re Cu	ver		

VALIDATION FINDINGS WORKSHEET **Sample Calculation Verification**

Page:_	<u> </u>	_1_
Reviewer:		My
2nd reviewer:	<u> </u>	

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

	N	N/A
Y	Λ	N/A
$\neg \nabla$		

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

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

Concentration = $(A_x)(I_x)(V_x)(DF)(2.0)$ (A_{is})(RRF)(V_o)(V_i)(%S)

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

Area of the characteristic ion (EICP) for the specific internal standard

Amount of internal standard added in nanograms (ng)

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

Volume of extract injected in microliters (ul)

Volume of the concentrated extract in microliters (ul)

Dilution Factor.

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

Example:

Sample I.D. # 1 I.I.

Conc. = (788 95)(40)(1ml)(150)()
(86 0287)(1. 6567)(36.09)(0,915)()

= 44.6

2 45 49 kg

2.0	= Factor of 2 to accou	nt for GPC cleanup			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
 					
 					
ļ					
 					
<u> </u>					

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23456

Chlorinated Pesticides



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 19, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3760-1

Sample Identification

SSAM3-02-11BPC** SSAM3-02-11BPC_FD SSAM3-02-11BPCMS SSAM3-02-11BPCMSD

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r²) was greater than or equal to 0.990.

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

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

V. Blanks

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

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

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for samples SSAM3-02-11BPC** and SSAM3-02-11BPC_FD. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

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

XII. Project Quantitation Limit

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

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3760-1	All compounds reported below the PQL.	J (all detects)	Α

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SSAM3-02-11BPC** and SSAM3-02-11BPC_FD were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentrat	tion (ug/Kg)	555	Difference		
Compound	SSAM3-02-11BPC**	SSAM3-02-11BPC_FD	RPD (Limits)	Difference (Limits)	Flag	A or P
4,4'-DDE	300	270	-	30 (≤180)	-	-
4,4'-DDT	180	150	-	30 (≤180)	-	-
Hexachlorobenzene	2600	1400	60 (≤50)	•	J (all detects)	А

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG 280-3760-1

SDG	Sample	Compound	Flag	A or P	Reason (Code)
280-3760-1	SSAM3-02-11BPC** SSAM3-02-11BPC_FD	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)
280-3760-1	SSAM3-02-11BPC** SSAM3-02-11BPC_FD	Hexachlorobenzene	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 280-3760-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 280-3760-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 7/8/10
Page:lof_/_
Reviewer: 0/14
2nd Reviewer:

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

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

	Validation Area		Comments
I,	Technical holding times	Ă	Sampling dates: 5 /19 /10
11.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	2 RSD r2 COV/101 = 20 Z
IV.	Continuing calibration/ICV	A	COV/101 = 20 2
V.	Blanks	A	
VI.	Surrogate spikes	ZW)	
VII.	Matrix spike/Matrix spike duplicates	WZ	
VIII.	Laboratory control samples	1	IES .
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Stage 2B validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Stage 2B validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 1,7
XV.	Field blanks	ND	FB = FB-04132010-RIG2-RZE (280-2410->

Note:

A = Acceptable

LDC #: 23456N3a

SDG #: 280-3760-1 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				
+	SSAM3-02-11BPC** 1	11	21	31	
† 2	SSAM3-02-11BPC_FD •	12	22	32	
3	SSAM3-02-11BPCMS	13	23	33	
4	SSAM3-02-11BPCMSD	14	24	34	
5	MB 280 - 16 598/A	15	25	35	
6	,	16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

LDC #: 73456 N 3A SDG #: See Cores

VALIDATION FINDINGS CHECKLIST

Page: __lof_2 Reviewer: _______ 2nd Reviewer: ______

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

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

LDC#: march N 3a SDG#: Cee Cover

VALIDATION FINDINGS CHECKLIST

Page: Pof 2
Reviewer: 11/2
2nd Reviewer: 2

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

VALIDATION FINDINGS WORKSHEET

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

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	96.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ŧ.
C. delta-BHC	K. Endrin	S. alpha-Chiordane	AA, Arocior-1254	II.
D. garmma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Arocior-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	XX.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	-1
G. Heptachlor epoxide	o. 4,4'-DDT	W. Aroclor-1221	EE.	мм.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_

53 456 N3a SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: Of) Reviewer:_ 2nd Reviewer:_

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

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

Were surrogates spiked into all samples, standards and blanks? Did all surrogate percent recoveries (%R) meet the QC limits?

Qualifications	No mal																		
lits)	(511-65)	(63-124)	()	(1)	((((((((((() (((
%R (Limits)	Do				TO THE														
Surrogate Compound	4	\$		В															
Column	api																		
Sample ID	(xw1) 1			2 (SDX)		With the second													
Date																			
#																			

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

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates

2nd Reviewer: Reviewer: DA Page: of 1

2 456 N3A

SDG#: LDC #:

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

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

									_																	
Qualifications	No stral																									
Associated Samples																										
	dilution	(`	(^	^	^	($\hat{}$	^	^	^	^	(^	^	((^		^	(((^	(
RPD (Limits))))	J	<u> </u>	J	_	J))))))	~)))	~	`))))	`
āž.	e 40																									
	dre	(Ŷ	(((((,)	-	^	^	^	()	())	(^)	((()
MSD %R (Limits)	ated	_	J	~	~)	J)	<i>\</i>)	~	<u> </u>	~	~	~)	~)))	<u>_</u>)	~)))
%F	calculated																									
	+	^	^	^	^	^	((,	(<u> </u>	-	_	^	^	^	^	()	(^	((^	(
MS %R (Limits)	7	_	_	~)))))	.	_	_	_	_	_	_		~)	`))	~	:))
% 8	Recoveries																									
punq	Reco																									
Compound																										
OI OSW/S	4		してとの																							
×	x	0	13																							
			-						-			-														
Date					_																					
# ا																										

LDC#: 23456N3a SDG#:See cover

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:_	<u>1</u> of 7
Reviewer:	W6
2nd Reviewer:	1/~

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

YN NA

Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

	Conc	(ug/Kg)	RPD	Diff	Diff Limits	Quals
Compound Name	1	2	(≤50%)	- DIII	Din Emilio	(Parent Only)
4,4'-DDE	300	270		30	≤180	
4,4'-DDT	180	150		30	≤180	
Hexachlorobenzene	2600	1400	60			Jdets/A (fd)

V:\FIELD DUPLICATES\23456N3a.wpd

LDC # 23 456 N SA SDG#

Initial Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**

Page: | of 4 Reviewer: 3

METHOD:

4,4'-DDT Parameter:

GC EPA SW 846 Method 8081A

Xw2							
Y	4.00	10.00	25.00	20.00	75.00	100.00	
X Area	22286.00	54850.00	139559.00	294636.00	443277.00	597478.00	
Compound	4,4'-DDT						
Column	CLP1		GCS_P2				
Date	04/26/2010				,		

5485.00 5582.36 5892.72 5910.36

5571.50

Regression Output:		Reported	
	00000	11 0	0.0000

0.998900

2 اا

4961.04943 0.99953 6.00000 5.00000

5850

E II

0.11 0.444903

5928.760416 36.118827

Degrees of Freedom No. of Observations

X Coefficient(s) Std Err of Coef.

Std Err of Y Est

Constant

R Squared

5736.12	
Ave RF	

5974.78

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Reviewer: NL 2nd Reviewer: L

2 of 4

Page:

METHOD: GC EPA SW 846 Method 8081A

4,4'-DDT

Parameter:

100.00 Conc 50.00 75.00 10.00 25.00 4.00 68045.00 171312.00 355511.00 525805.00 705006.00 26707.00 Area × Compound 4,4'-DDT GCS_P2 Column CLP2 04/26/2010 Date

Regression Output:		Reported	
Constant	-2800.24293	11 0	N.
Std Err of Y Est	3336.78918		
R Squared	0.99991	12=	0.99900
No. of Observations	0000009		
Degrees of Freedom	3.00000		
		II	a R
X Coefficient(s) 7098.583493	3493 -0.256471	= q	A.R.
Std Err of Coef. 159 475846	5846 1.53		

6804.50	6852.48	7110.22	7010.73	7050.06	

2500.00 5625.00 10000.00

100.00 625.00

16.00

X^2

6676.75

Ave RF 6917.46

SDG# 23 4[7] N34 SDG# 160 Cm

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: W Page: 7 of 4

> GC EPA SW 846 Method 8081A METHOD:

Hexachlorobenzene Parameter:

X^2	And the state of t	A PARTY AND A PART					
Y Conc	4.00	10.00	25.00	50.00	75.00	100.00	
X Area	39031.00	92016.00	218583.00	438324.00	653554.00	861853.00	
Compound	Hexachlorobenzene						
Column	CLP1		GCS_P2				
Date	04/26/2010						

9757.75

9201.60 8743.32 8766.48 8714.05 8618.53

8966.96

Ave RF

Regression Output:			Reported	
Constant		0.0000	= 3	0.00000
Std Err of Y Est		4707.31355		
R Squared		0.99979	r2 =	0.999900
No. of Observations		0000009		
Degrees of Freedom		5.00000		
			m1 =	8633
X Coefficient(s)	8674.807007	0.444903		
Std Err of Coef.	34.271508	0.11		

LDC #22 456 N 34 SDG# 22 Cr SDG#

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

GC EPA SW 846 Method 8081A METHOD:

Hexachlorobenzene Parameter:

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

Regression Output:			Reported	
Constant		8023.22168	II O	NR R
Std Err of Y Est		2267.04743		
R Squared		0.99998	12=	1.000000
No. of Observations		00000:9		
Degrees of Freedom		3.00000		:
			ш П	X X
X Coefficient(s)	12623.434031	-13.727283	= q	A.N
Std Err of Coef.	108.349460	1.04		

13452.60 12486.00 12100.26 11725.92 11321.66

14604.50

12615.16 Ave RF

4 ° Page: ___

SDG# 51 Che 1

VALIDATION FINDINGS WORKSHEET Continuing Calibration Calculation Verification

Page: 1 of A Reviewer: 004 2nd Reviewer: 1

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

Recalculated 3,3 2.9 0.0 0.0 Reported **□** % 2.3 2.3 0.0 0.0 Recalculated Conc 49.99 49.99 51.67 48.57 Reported 51.10 50.00 50.00 Conc 48.80 CCV Conc 8 8 8 8 CLP2 CLP1 Hexachlorobenzene CLP1 Hexachlorobenzene CLP2 Compound 4,4'-DDT 4,4'-DDT Calibration 6/3/2010 Standard ID 005F0501 0 #

				CCV1	CCV2
Compound	Ø	р	υ	Area	Area
HCB CLP1		8633.00		446078	
4,4'-DDT CLP1		5850.00		284109	
HCB CLP2	-13.727283	12623.43	8023.22	604834	
4,4'-DDT CLP2	-0.256471	7098.58	-2800.24293	351341	

LDC #: 23 476 N 34 SDG #: Sa Con

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	lof/_
Reviewer:	N
2nd reviewer:	W

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

The percent recoveries	: (%R) of surrogates were	recalculated for the com	mounds identified belo	w using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	CIRI	20	0	b,	D	NC
Decachlorobiphenyl				<i>\</i>	J-	V
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 # 73 456 N % SDG #:

VALIDATION FINDINGS WORKSHEET

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

2. Change Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

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

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

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

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

LCS 280- 16 948/2-A LCS/LCSD samples:

	Ġ.	ike	Spiked	Sample	רל	SOT	C	LCSD	/SOT	CCS/LCSD
Compound	(Ag	Added (15/k)	Concentration ($(05/c)$	ntration 1/5/5	Percent 8	Percent Recovery	Percent !	Percent Recovery	8	RPD
	SOT	gsol _⊘	SOT	CcsD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.3	\$	(3.7	MA	43	58				
4,4'-DDT	`		13.4		23	× 8				
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 #:	2392	N	34
SDG #:	. 0		,

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:	37 2
2nd reviewer:	1/

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

	N	N/A
V	N	N/A

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

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

Example:	
Sample I.D.	Hexachlorokeneme
Conc. = (634 989) ((ION) (IN)
Conc. = (634 989) (30.78) (0. 922
= 25 98,6	

~ 2600 us ky

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

Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23456

Metals



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 6, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2131-12

Sample Identification

SSA06-02-2BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2131-12	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2131-12

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2131-12	SSA06-02-2BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2131-12

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2131-12

No Sample Data Qualified in this SDG

		Tronox Northgate Henderson
LDC #:	23456A4	_ VALIDATION COMPLETENESS WORKSHEET
SDG #:_	280-2131-12	Stage 2B
Laborato	ry: Test America	

Date: 7-7-10
Page: of 1 Reviewer:
2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/6/10
11.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N_{μ}	Chent specified
VII.	Duplicate Sample Analysis	\sim	Į.
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\triangle	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Not oreformed
XI.	ICP Serial Dilution	N	Notpresormed
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV	Field Duplicates	\mathcal{N}	
XV	Field Blanks	NO	FB=FB-04072010-RZC(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:						
1	SSA06-02-2BPC	11	GB5	21	31	
2		12		22	32	
3		13		23	33	
4		14		24	34	
5 .		15		25	35	
6		16		26	36	
7		17		27	. 37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 7, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2216-10

Sample Identification

SA137-9BPC SA137-9BPCMS SA137-9BPCMSD

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 6020 for Metals. The metals analyzed were Cobalt and Manganese.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Associated Samples	
PB (prep blank)	Manganese	0.280 mg/Kg	All samples in SDG 280-2216-10
ICB/CCB	Cobalt Manganese	0.0115 ug/L 1.11 ug/L	All samples in SDG 280-2216-10

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

Sample FB-04072010-RZC (from SDG 280-2280-2) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 ug/L	All samples in SDG 280-2216-10

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA137-9BPCMS/MSD (All samples in SDG 280-2216-10)	Cobalt	136 (75-125)	-	-	J+ (all detects)	A

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2216-10	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2216-10

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2216-10	SA137-9BPC	Cobalt	J+ (all detects)	А	Matrix spike/Matrix spike duplicates (%R) (m)
280-2216-10	SA137-9BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2216-10

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2216-10

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET age 2B

LDC #:	23456B4	VALIDATION COMPL
SDG #:	280-2216-10	Sta
Laborato	rv: Test America	

Page:__tof__ Reviewer:__CC__ 2nd Reviewer:______

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

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 9/7/16
11.	ICP/MS Tune	A	
- 111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	Sul	rosio
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	Α	
Χ.	Furnace Atomic Absorption QC	\sim	Notublized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
XV	Field Blanks	52	FB=FB-04072010-RZC(250-2280-2)

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: ()

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

Notes:	

LDC #: 7345684 SDG #: 500002

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of Reviewer: 2nd reviewer: 1

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, MR, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
3:72		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
* 57		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cd, Cu, Fe, Pb, Mg, Mn) Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,

Comments:	Mercury by CVAA if performed		

LDC #: 23456B4 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: 100x Associated Samples: All

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: mg/Kg

Γ		Γ		-		
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		-		-		
	No Qualifier					
				1		
	Action Limit				2.80	
	unu CB ₃		4		_	
	Maximum Maximum Maximum PB* ICB/CCB*	(ug/L)	Š	0.0113	111	
	imum 'Bª	(ng/L)				
	Max P					
	cimum Bª	(mg/kg)			080	202
		E			_	<u>ا</u>
	Analyte					
	A			ပိ	2	

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

LDC #: 23456B4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: <u>∖</u> Reviewer:_ 2nd Reviewer:_

Were target analytes detected in the SI Were target analytes detected in the SI Were target analytes detected in the

Were field blanks identified in this SDG?

Field Blank: (bf)

₹

Associated Samples:

Were target analytes detected in the field blanks?

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

Sampling date: 4/8/10

Soltfactor applied 100x Sampling date: 4/8/10 Solt (actor applied 10/ Field blank type: (circle one) Field Blank / Rinsate / Other.

Sample Identification No Quals Action Level FB-04072010-RZC (SDG#: 280-2280-2) Blank ID 0.016 Analyte ပိ

100 # 2345/64 spe : 292 carel

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

2nd Reviewer:_ Reviewer:_

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

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

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

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

of 4 or more, no action was taken.

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

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

Y N K/A We

Qualifications)+0et/17	No Qual (22) in											
Associated Samples	=======================================)											
y RPD (Limits)		27											
MSD %Recovery													
MS %Recovery	136												
	ည												
Matrix	ς.												
MS/MSD ID	2/2												

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 8, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Manganese

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2280-9

Sample Identification

SA188-4BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples			
PB (prep blank)	Manganese	0.280 mg/Kg	All samples in SDG 280-2280-9			
ICB/CCB	Manganese	1.37 ug/L	All samples in SDG 280-2280-9			

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

Sample EB-04072010-RZC (from SDG 280-2383-1) was identified as an equipment blank. No manganese was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples			
EB-04072010-RZC	4/8/10	Manganese	15 ug/L	All samples in SDG 280-2280-9			

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2280-9	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Data Qualification Summary - SDG 280-2280-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2280-9	SA188-4BPC	All analytes reported below the PQL.	J (all detects)	Α	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2280-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Equipment Blank Data Qualification Summary - SDG 280-2280-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Field Blank Data Qualification Summary - SDG 280-2280-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ORKSHEET

DC #:	23456C4	VALIDATION COMPLETENESS W
 SDG #:	280-2280-9	_ Stage 2B
aborato	ry: Test America	

Page: Lof) 2nd Reviewer:

METHOD: Mn (EPA SW 846 Method 6020)

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

	Validation Area		Comments
		\sim	Sampling dates: 4/8/10
1.	Technical holding times	<u> </u>	Sampling dates.
11.	ICP/MS Tune	<i>Y</i>	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (SD64 280-2216-10)
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	•
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	No+ unitized (SDG * 280-7216-10)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A.	
XIV.	Field Duplicates	\mathcal{N}	
XV	Field Blanks	SW	FB- FB-04072010-RZC EB-EB-04071010-RZC

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

C 780-2780-2) D = Duplicate

TB = Trip blank
EB = Equipment blank

Validated Samples: \

	<u> </u>					7
1	SA188-4BPC	11	<i>RBS</i>	21	 31	
2		12		22	32	
3		13		23	33	
4		14		24	 34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

otes:

LDC #: 23456C4 SDG #: See Cover

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: mg/Kg

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

2nd Reviewer: Page: _____ Reviewer: _____

L			
	fier		
	No Quali		
	Action	00 0	7.00
	Maximum ICB/CCB ^a (uq/L)	100	1.5.1
	Maximum PB ^a	(Life)	
	Maximum PB ^a	(6) (6)	0.280
	Analyte		Mn

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

SDG #: See Cover LDC #: 23456C4

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer:_ 2nd Reviewer:

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

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

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

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

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

Field Blank: (be)

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Associated Samples:_

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ation													
Sample Identification													
S													
	No Quals												
	Action Level	15											
Blank ID	EB-04072010-RZC (SDG#: 280-2383-1)	15		- AANAMANA JAYA	 - Address of the second of the			-	**************************************				
Analyte		M											

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

2000

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 9, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2301-9

Sample Identification

RSAK8-9BPC RSAK8-9BPCMS RSAK8-9BPCMSD

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 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.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Sample FB-04072010-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) were within QC limits.

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2301-9	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2301-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2301-9	RSAK8-9BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2301-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2301-9

No Sample Data Qualified in this SDG

		Tronox Northgate Henderson
LDC #:	23456D4	VALIDATION COMPLETENESS WORKSHEET
SDG #:	280-2301-9	Stage 4
Laborator	ry: Test America	

Page: lof l Reviewer: 2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 4/9/10
II.	ICP/MS Tune	D	•
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	msp
VII.	Duplicate Sample Analysis	N	- 12
VIII.	Laboratory Control Samples (LCS)	A	us
IX.	internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\mathcal{N}	Abrutited
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\wedge	
XV	Field Blanks	ND	FB=FB-04072010-RZD (280-2216-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>					
1	RSAK8-9BPC	11	8635	21	31	
2	RSAK8-9BPCMS	12		22	32	
3	RSAK8-9BPCMSD	13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		

LDC#: 234560H SDG#: Secover

VALIDATION FINDINGS CHECKLIST

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		<u> </u>		
Were all isotopes in the tuning solution mass resolution within 0.1 amu?		<i>-</i>		
Were %RSD of isotopes in the tuning solution ≤5%?			<u> </u>	
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?			ļ	
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?			<u> </u>	
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) \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 #: 7345604 SDG #: 500 caret

VALIDATION FINDINGS CHECKLIST

Page: __of __ Reviewer: __< 2nd Reviewer: __

Validation Area	Yes	No	NA	Findings/Comments				
			L					
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			T					
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.		/	<u> </u>					
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?		<u></u>						
XI. Regional Quality Assurance and Quality Control								
Were performance evaluation (PE) samples performed?			<u> </u>					
Were the performance evaluation (PE) samples within the acceptance limits?		<u></u>	Ļ					
XII. Sample Result Verification								
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?								
XIII. Overall assessment of data								
Overall assessment of data was found to be acceptable.	/							
XIV. Field duplicates			·,					
Field duplicate pairs were identified in this SDG.			<u> </u>					
Target analytes were detected in the field duplicates.			_	<u> </u>				
XV. Field blanks								
Field blanks were identified in this SDG.	/	<u> </u>	_					
Target analytes were detected in the field blanks.								

SDG#: 2345604 SDG#: SECOVER

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: CZ

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

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

%R = Found × 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	As	610,3	40,0	(0)	101	2
700	ICP/MS (Continuing calibation)	\rightarrow	2/19	50.0	701	701	

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 #. 23456DY

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Reviewer: Page:_ 2nd Reviewer:

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

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

%R = Found × 100

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

True = Concentration of each analyte in the source.

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

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

Where,

S = Original sample concentration D = Duplicate sample concentration

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

%D = |-SDR| 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 18/1 S/ES	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
1CS PRS	ICP interference check	35	103ug/L	100mg/L	103	ا کر01	<u> </u>
\$57	Laboratory centrol sample		b'61	0.02	100	99	۷
2	Matrix spike	•	$2b_{\text{NS-NSS}}$	12	16	26	
23	Duplicate		052	13,7	9	5	
	ICP serial dilution	\rightarrow	5,80	18.5	0.17	62.0	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 #: 2450 SDG #: Secore

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	C or)
Reviewer:_	Ce
2nd reviewer:_	M

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

Please Y N Y N Y N	N/A N/A	have results been reported	ted range of the instruments and within the linear range of the ICP?	
	ed analy ng equat	te results for	were recalculated and verified using the	
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	
RD FV In. Vol. Dil %S	= = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	(100my/5) (10.75mg/L) = 5.8mg/k CO.933)(1.00g)	8

			•	
Sample ID	Analyte	Reported Concontration (MS/RS)	Calculated Concentration (MK RY)	Acceptable (Y/N)
\	L As	5.8	5.8	
				•
			• • • • • • • • • • • • • • • • • • • •	
			·	
	I	l	l	L

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 13, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2400-12

Sample Identification

SA139-4BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination.

 This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.0382 mg/Kg	All samples in SDG 280-2400-12
ICB/CCB	Cobalt Manganese	0.0443 ug/L 0.402 ug/L	All samples in SDG 280-2400-12

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

Sample FB-04072010-RZC (from SDG 280-2280-2) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072010-RZC	4/8/10	Cobalt	0.016 ug/L	All samples in SDG 280-2400-12

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2400-12	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-2400-12

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2400-12	SA139-4BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-2400-12

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-2400-12

No Sample Data Qualified in this SDG

Tronox Northgate Henderson T

LDC #:	23456E4	VALIDATION COMPLETENESS WORKSHEE
SDG #:	280-2400-12	Stage 2B
Laborator	y: <u>Test America</u>	

2nd Reviewer:

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 4/13/10
II.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	P	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	\sim	L
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notukitzeb
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\wedge	
XV	Field Blanks	SW	FB= FB-04072010-RZC

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(750-1750-7) D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

1	SA139-4BPC	11	385	21	31	
2		12		22	32	
3		13		23	33	
1		14		24	34	
<u>4</u> 5		15	.,	25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		

LDC #: 2315624 SDG #: SECTOR 2

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	Wilder	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn) Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	4-10-11-11-11-11-11-11-11-11-11-11-11-11-	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni; K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN'
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be, Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni. K. Se. Ag. Na. Tl. V. Zn. Mo. B. Si. CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu, Fe. Pb. Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr(Co), Cu, Fe, Pb, Mg(Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments:	Mercury by CVAA if performed	

VALIDATION FINDINGS WORKSHEET

Page: __of_

PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

SDG #: See Cover LDC #: 23456E4

Soil preparation factor applied: 100x Associated Samples: All

ample Con	Analyte	ပိ	Mn
centration ur	Maximum PB ^a (mg/Kg)		0.0382
its, unless o	Maximum Maximum PB ^a ICB/CCB ^a (mg/Kg) (ug/L) (ug/L)		
Sample Concentration units, unless otherwise noted: mg/Kg	Maximum ICB/CCB ^a (ug/L)	0.0443	0.402
ed: mg/Kg	Action		
`	No Qualifier		
Associated Samples:			
ss: All			
			ii ii

a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note: 1.390

LDC #: 23456E4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer 2nd Reviewer:_

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

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

Were target analytes detected in the field blanks?

Field Blank: (bf)

₹

100x Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/8/10 Soil factor applied 1

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

Sample Identification No Quals Action Level FB-04072010-RZC (SDG#: 280-2280-2) Blank ID 0.016 Analyte ပိ

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Arsenic

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-14

Sample Identification

SSAP3-01-1BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination.

 This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No arsenic was found in these blanks.

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-14	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2448-14

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-14	SSAP3-01-1BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Laboratory Blank Data Qualification Summary - SDG 280-2448-14

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Equipment Blank Data Qualification Summary - SDG 280-2448-14

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2448-14

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

.DC #:	23456F4	VALIDATION COMPLETENESS WORKSHEET
DG #:	280-2448-14	Stage 2B
aborato	ry: Test America	

Date: 7-7-10)
Page: _c_of <u>\</u>	
Reviewer: 2	
2nd Reviewer: ~	_

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	PT	Sampling dates: U/ IY/IO
II.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	Α	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	N	Client specified
VII.	Duplicate Sample Analysis	\mathcal{N}_{-}	T ,
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	17	
Χ.	Furnace Atomic Absorption QC	N	Notutitized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	NO	FB=FB-04072010-RZC.EB=EB-04147010-RIGI- (280-2280-2) 2 EB-04142010-RIGZ

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

(280-2448-2

Validated Samples:

	2011				 	
1	SSAP3-01-1BPC	11	RBS	21	31	
2		12	· J	22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	 37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

April 14, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Manganese

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-2448-15

Sample Identification

SA43-2BPC SA43-3BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.280 mg/Kg	All samples in SDG 280-2448-15
ICB/CCB	Manganese	1.11 ug/L	All samples in SDG 280-2448-15

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

Samples EB-04142010-RIG1-RZC and EB-04142010-RIG2-RZC (both from SDG 280-2448-2) were identified as equipment blanks. No manganese was found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-04142010-RIG1-RZC	4/14/10	Manganese	1.6 ug/L	All samples in SDG 280-2448-15
EB-04142010-RIG2-RZC	4/14/10	Manganese	18 ug/L	All samples in SDG 280-2448-15

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2448-15	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Data Qualification Summary - SDG 280-2448-15

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2448-15	SA43-2BPC SA43-3BPC	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Laboratory Blank Data Qualification Summary - SDG 280-2448-15

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Equipment Blank Data Qualification Summary - SDG 280-2448-15

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Field Blank Data Qualification Summary - SDG 280-2448-15

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7-7-16
Page: Lof
Reviewer:
2nd Reviewer:

SDG #: 280-2448-15 Laboratory: Test America

23456G4

LDC #:

METHOD: Mn (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	\bigcirc	Sampling dates: 4/14/10
II.	iCP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (SD64 Z80-2216-10)
VII.	Duplicate Sample Analysis	Ν	
VIII.	Laboratory Control Samples (LCS)	A	LCS
iX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	\mathcal{N}	Not utilized
XI.	ICP Serial Dilution	A	No+ utilized CSDG x 280-2216-10)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	$ \mathcal{N} $	
XV	Field Blanks	SW	FB= FB-04072010-RZC. EB= EB-04142010-RIGI-RZ

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(780-7780-7) ed D = Duplicate

TB = Trip blank

EB = Equipment blank

= EB-04142010-RIGZ-RZC

(280-2448-2)

Validated Samples:

	20,1					
1	SA43-2BPC	11	GBS	21	31	
2	SA43-3BPC	12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

SDG #: See Cover LDC #: 23456G4

Analyte

₹

Associated Samples:

mg/Kg

Page: of Reviewer: C.Z.

No Qualifier Action Limit 2.80 Sample Concentration units, unless otherwise noted: Maximum ICB/CCB^a (ug/L) 1.1 Maximum PB^a (ug/L) Maximum PB^a (mg/Kg) 0.280

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

LDC #: 23456G4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Page.∕ Reviewer 2nd Reviewer:

Field Blanks

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

МЕТНОD: Trace Metals (EPA SW846 6010В/7000)

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

Soil factor applied 100x Blank units: ug/L Associated sample units: mg/Kg Sampling date: 4/14/10 Soil factor applied 100x

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

Reason: be

₹

Associated Samples:

				 		 	 				 	 _
ntification												
Sample Identification												
	No Qualifiers											
	Action N	18			***************************************							
Blank ID	2-RZC 18-2)	18							LINE CONTRACTOR OF THE CONTRAC			
Blank ID	31-RZC 48-2)	_						in the state of th				
Analyte		Mn										

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-2995-7	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Data Qualification Summary - SDG 280-2995-7

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-2995-7	SSAN6-07-6BPC	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 280-2995-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Arsenic - Field Blank Data Qualification Summary - SDG 280-2995-7

No Sample Data Qualified in this SDG

Trancy Marthanta Handarean

LDC #: 23456H4	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-2995-7	Stage 4
Laboratory: Test Amer	

2nd Reviewer:

METHOD: As (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 4/28/10
11.	ICP/MS Tune	A	3
III.	Calibration	Θ	
IV.	Blanks	7	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	\mathcal{N}	Client specified
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	Ν.	Abtualized
XI.	ICP Serial Dilution	N	No+ presormed
XII.	Sample Result Verification	A	,
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
ΧV	Field Blanks	M	FB=FB-04072010-RZC

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

(780-2280-2) D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

	2011				
1	SSAN6-07-6BPC	11 PB	S 21	31	
2		12	22	32	
3		13	23	33	
4		14	24	34	
5		15	25	35	
6		16	26	36	y-,
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:	
	

LDC# 23456HY SDG# SECOVER

VALIDATION FINDINGS CHECKLIST

Page: of 2
Reviewer: 0
2nd Reviewer: V

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	,			·
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?				
Were all initial calibration correlation coefficients > 0.995?				
IV. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) \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?	14	,		
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# 23456H9 SDG# SECCART

VALIDATION FINDINGS CHECKLIST

Page: __of __ Reviewer: __ <</rr>
2nd Reviewer: __ </rr>

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%? (I.evel IV only)			_	
Were analytical spike recoveries within the 85-115% QC limits?			L.,_	
IX. ICP Serial Dilution		<u> </u>		
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	,		<u> </u>	
Were performance evaluation (PE) samples performed?	ļ			
Were the performance evaluation (PE) samples within the acceptance limits?				
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.		Ĺ		
XIV. Field duplicates				•
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.	<u> </u>		/	
XV. Field blanks				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.		/		

SDG#. 2345647 SDG#: SECOVER

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of Beviewer: GZ

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

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

%R = <u>Found</u> 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)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)			,			
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	SH)	h. g.	40 <i>C</i>	101	/ 0}	>
73	ICP/MS (Continuing calibation)	7	51.6	0.03	(03	E01	-}

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. 7

SDG # 5245KHY

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Reviewer: 2nd Reviewer: Page:

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

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

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

True = Concentration of each analyte in the source.

%R = Found x 100

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

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

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

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

%D = II-SDRI x 100

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

-		HULLON NEST	in (mg/L) (msu ament Nedanig A J)	(C.			
					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)
ICSPAS	ICP interference check	As	100 rg/L	100 right	100	160	\mathcal{L}
527	Laboratory centrol sample	\rightarrow	19.7 malks	200mg/k	66	66)
~	Matrix spike		(SSR-SR)				
2	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 #: 23456H9 SDG #: Secare

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

Please Y N Y N Y N	N/A	have results been reported and	d calculated correctly? I range of the instruments a	ole questions are identified as "N/A".
	ed analy ng equat	te results for	<u>As</u>	were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation:	~ ~ (7 (du m/s)
RD FV In. Vot. Dil %S	= = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	$\frac{(000)}{(0.91)}$	L)(5) (7.94.1g/L) 1000 = 3.9 mg/kg

	() () ()			
Sample ID	Analyte	Reported Concentration (MS/KS)	Calculated Concentration (MS / KG)	Acceptable (Y/N)
	AS	3,9	3,9	Y
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 4, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Manganese

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3197-9

Sample Identification

SSAN8-01-2BPC

Introduction

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

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.280 mg/Kg	All samples in SDG 280-3197-9
ICB/CCB	Manganese	1.37 ug/L	All samples in SDG 280-3197-9

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3197-9	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Data Qualification Summary - SDG 280-3197-9

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3197-9	SSAN8-01-2BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Laboratory Blank Data Qualification Summary - SDG 280-3197-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Equipment Blank Data Qualification Summary - SDG 280-3197-9

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Field Blank Data Qualification Summary - SDG 280-3197-9

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 234561		N COMPLETENESS	
SDG #: 280-31	197-9	Stage 2B	
Laboratory: Test A	merica		

Date:	7-7-10
Page: <u>1</u>	_of
Reviewer:	CC
2nd Reviewer:	-V-

METHOD: Mn (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 5/4/10
II.	ICP/MS Tune	12	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D CSDGA 280-2216-10)
VII.	Duplicate Sample Analysis	\sim	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	A	(SDGA 280-2216-10)
XII.	Sample Result Verification	N	,
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	FB=FB-04072010-RZC (Z8022802)

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:

50.1

	900				 	
1	SSAN8-01-2BPC	11	€∞5	21	31	
2		12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		
,		

LDC #: 2345614 SDG #: See Cover METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: mg/Kg

VALIDATION FINDINGS WORKSHEET PRICE/CCB QUALIFIED SAMPLES

Page: L Reviewer: C 2nd Reviewer:

Soil preparation factor applied: 100x Associated Samples: All

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	Maximum PB³ (mg/Kg)	0.280
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a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note:

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

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 25, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Metals

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3955-1

Sample Identification

SA44-5BPC SA180-2BPC SA180-5BPC SA09-2BPC SA09-5BPC**

SA44-2BPC SSAR3-01-1BPC SSAR3-01-5BPC** RSAJ3-3BPCMS RSAJ3-3BPCMSD RSAJ3-5BPCMS RSAJ3-5BPCMSD SA165-2BPC SA165-5BPC**

SA70-2BPC SA70-5BPC RSAJ3-2BPC

SA160-2BPC SA160-5BPC**

RSAJ3-2BPC FD

RSAJ3-3BPC**

RSAJ3-5BPC

SA57-2BPC

SA57-5BPC

RSAN7-2BPC

RSAN7-5BPC

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 26 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020 and 7000 for Metals. The metals analyzed were Arsenic, Magnesium, Manganese, and Mercury.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.0784 mg/Kg	SA44-2BPC SA44-5BPC SA180-2BPC SA180-5BPC SA09-2BPC SA09-5BPC** SA165-2BPC SA165-5BPC** SA160-2BPC SA160-5BPC** RSAJ3-2BPC RSAJ3-2BPC_FD RSAJ3-3BPC**
PB (prep blank)	Magnesium	2.13 mg/Kg	SA70-2BPC SA70-5BPC RSAJ3-2BPC RSAJ3-2BPC_FD RSAJ3-3BPC**
PB (prep blank)	Manganese	0.190 mg/Kg	RSAJ3-5BPC SA57-2BPC SA57-5BPC RSAN7-2BPC RSAN7-5BPC

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Magnesium	1.57 mg/Kg	RSAJ3-5BPC
ICB/CCB	Manganese	0.430 ug/L	SA44-2BPC SA44-5BPC SA180-5BPC SA09-2BPC
ICB/CCB	Magnesium	5.19 ug/L	SA70-2BPC SA70-5BPC RSAJ3-2BPC
ICB/CCB	Magnesium	5.04 ug/L	RSAJ3-2BPC_FD RSAJ3-3BPC**
ICB/CCB	Magnesium	6.34 ug/L	RSAJ3-5BPC
ICB/CCB	Manganese	0.317 ug/L	SA57-5BPC RSAN7-2BPC RSAN7-5BPC

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

Sample EB05262010-RZD (from SDG 280-3955-3) was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB05262010-RZD	5/25/10	Manganese	5.5 ug/L	RSAJ3-2BPC RSAJ3-2BPC_FD RSAJ3-3BPC** RSAJ3-5BPC
EB05262010-RZD	5/25/10	Magnesium	56 ug/L	SA70-2BPC SA70-5BPC RSAJ3-2BPC RSAJ3-2BPC_FD RSAJ3-3BPC** RSAJ3-5BPC

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), FB-04072010-RZC (from SDG 280-2280-2), FB-04072101-RZD (from SDG 280-2216-2), and FB-04132010-RIG2-RZE (from SDG 280-2400-2) were identified as field blanks. No metal contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB-04072101-RZD	4/7/10	Manganese	1.3 ug/L	RSAJ3-2BPC RSAJ3-2BPC_FD RSAJ3-3BPC** RSAJ3-5BPC

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD relative percent difference (RPD) was not within QC limits for one analyte, the MS, MSD, and LCS percent recoveries (%R) were within QC limits and no data were qualified.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All 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 280-3955-1	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 RSAJ3-2BPC and RSAJ3-2BPC_FD were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/Kg)					
Compound	RSAJ3-2BPC	RSAJ3-2BPC_FD	RPD (Limits)	Difference (Limits)	Flags	AorP	
Magnesium	12000	12000	0 (≤50)	-	-	-	
Manganese	370	410	10 (≤50)	-	-	-	

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-3955-1

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3955-1	SA44-2BPC SA44-5BPC SA180-2BPC SA180-5BPC SA09-2BPC SA09-5BPC** SA165-5BPC** SA165-5BPC** SA160-5BPC SA160-5BPC SA70-5BPC RSAJ3-2BPC RSAJ3-2BPC RSAJ3-3BPC-** RSAJ3-5BPC SA57-5BPC RSAN7-2BPC SA57-5BPC SA57-5BPC RSAN7-5BPC RSAN7-5BPC SSAR3-01-1BPC SSAR3-01-5BPC**	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-3955-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-3955-1

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG 280-3955-1

No Sample Data Qualified in this SDG

Tronox Northgate Henderson EET

		Tronox Northgate Henderson
_DC #:	23456P4	VALIDATION COMPLETENESS WORKSHI
SDG #:	280-3955-1	_ Stage 2B/4
aborator	v: Test America	

	Date:_/	F/10
	Page: 1	of
	Reviewer:	ri
2nd F	Reviewer:_	<u> </u>

SOF FB

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

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: 5/25/1()
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	ms/D
VII.	Duplicate Sample Analysis	\mathcal{N}	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	Ň	NotuEilized
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	(CB,14)
XV	Field Blanks	ŠU	EB=EB05Z6Z010-RZD See below

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank (280-3955-3) D = Duplicate

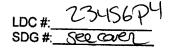
TB = Trip blank

EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

	SOU						
1	SA44-2BPC	11	SA70-2BPC	21	SSAR3-01-1BPC	31	RB51
2	SA44-5BPC	12	SA70-5BPC	22	SSAR3-01-5BPC**	32	8052
3	SA180-2BPC	13	RSAJ3-2BPC	23	RSAJ3-3BPCMS	33	
4	SA180-5BPC	14	RSAJ3-2BPC_FD	24	RSAJ3-3BPCMSD	34	
5	SA09-2BPC	15	RSAJ3-3BPC**	25	RSAJ3-5BPCMS	35	
6	SA09-5BPC**	16	RSAJ3-5BPC	26	RSAJ3-5BPCMSD	36	
7	SA165-2BPC	17	SA57-2BPC	27		37	·
8	SA165-5BPC**	18	SA57-5BPC	28		38	
9	SA160-2BPC	19	RSAN7-2BPC	29		39	
10	SA160-5BPC**	20	RSAN7-5BPC	30		40	

Notes:_	1	FB	FB04062010-RZB (280-2131-2)
			FB-04072010- RZC (280-2280-2)
			FB-04072010-RZD (280-2216-27)
			FB-04132010-RIGZ-RZE CZ80-2400-2)



VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: CZ 2nd Reviewer:

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

1100110011Wetais (EPA SVV 646 Wetriod 60 10B/7000/6020)		·		
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?		•		
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?				
Were all initial calibration correlation coefficients > 0.995?				
IV. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) \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.	3000	V		
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?				
mits for soils?				

LDC#: 23456P4 SDG#: Sec Caret

VALIDATION FINDINGS CHECKLIST

Page: __of __ 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%?	_		ļ <u> </u>	
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?		<u> </u>	L	
XI. Regional Quality Assurance and Quality Control			_	
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?		<u> </u>		
XII. Sample Result Verification	,	,		
Were RLs adjusted to reflect all sample ditutions and dry weight factors applicable to level IV validation?	/	r		
XIII. Overall assessment of data		a		
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.	1			
Target analytes were detected in the field blanks.	/			

LDC #: 13456P4 SDG #: 580 COOP

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: 1 of
Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID Matrix	Target Analyte List (TAL)
1-6910,720	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
7,6	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg) Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
11,72	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
13-16	Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
21,22	Al, Sb.(As) 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,
OC BUH	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
L-25,76	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al. Sb. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg. Mn. Hg. Ni, K. Se. Ag. Na, Tl. V. Zn, Mo, B, Si, CN
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
	Al. Sb. As. Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
· · · · · · · · · · · · · · · · · · ·	Analysis Method
ICP	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS	Al, Sb, (As,)Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, (Mg, Mn) Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
GFAA	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed

LDC #: 23456P4 SDG #: See Cover METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET

Soil preparation factor applied: 100x x 5xdil Associated Samples: 1-10, 13-15 PB/ICB/CCB QUALIFIED SAMPLES

2nd Reviewer:__ Reviewer: , Page: (

Sample Co	Sample Concentration units, unless otherwise noted: mg/Kg	nits, unless (otherwise not	ted: mg/Kg	2nd Reviewer: <u> Nov. x 5xdil Nov. x 5xdil Nov. x 5xdil Nov. x 5xdil Nov. x 5xdi</u>	iewer:
				13.8		
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn	0.0784					
Sample Co	Sample Concentration units, unless otherwise noted:	nits, unless o	otherwise not	ted: mg/Kg	/Kg Associated Samples: 11-15	
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mg	2.13			21.3		
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	otherwise not	ted: mg/Kg	/Kg Associated Samples: 16-20	
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn	0.190					
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	therwise not	ed:mg/Kg	/Kg Associated Samples: 16	1000000
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mg	1.57			15.7		
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	otherwise not	.ed: mg/Kg	Kg Associated Samples: 1, 2, 4, 5	
Analyte	Maximum PB³ (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn			0.430			

LDC #: 23456P4	3456P4				>	/ALIDATION FINDINGS WORKSHEET	DINGS WOR	(SHEET			Pa	Page: 24/2
SDG #: See Cover METHOD: Trace met	SDG #:_See Cover_ METHOD: Trace metals (FPA SW 864 Method 6010B/6020/7000)	(FPA SW 86	34 Method 60	210B/6020/7		PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x y 5xdil	CB/CCB QUALIFIED SAMPLES	MPLES 100x x 5x	Ę		Reviev	Reviewer: CC
Sample Co	Sample Concentration units, unless otherwise noted: mg/Kg	nits, unless o	otherwise no	ted: mg/Kc) } 	Associated Samples: 11-13	ss: 11-13					
Analyte	Analyte Maximum Maximum Maximum Action No Qualifier	Maximum	Maximum Maximum	Action	No Qualifier			-				

Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier
Mg			5.19		
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	therwise not	ed: mg/Kg	Kg Associated Samples: 14, 15
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier
Mg			5.04		
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ed: mg/Kg	Kg Associated Samples: 16
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier
Mg			6.34		
Sample Cor	Sample Concentration units, unless otherwise noted:	nits, unless c	therwise not	ed: mg/Kg	Kg Associated Samples: 18-20
Analyte	Maximum PB³ (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier
Min			0.317		

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

SDG #: See Cover LDC #: 23456R4

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer. C 2nd Reviewer.

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Other: Blank units: ug/L Asso Sampling date: 5/25/10

Reason Code: be

Sampli Field b	Sompling date: 5/25/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other.	Soil Field B	factor applie	d 100x te / Other:)X (EB)	Assoc	ciated Sampl	es:	= kw @	Associated Samples: Mar 13-16, Mr. 13-16	10-13-	9
Analyte	Blank ID					,	Sample Identification	cation				
	EB05262010-RZD (SDG#: 280-3955-3)	Action Level	NO QUANS	S/S								
Mn	5.5	5.5										
Mg	56	56										
·				. —								

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

1245P SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer. 2nd Reviewer.

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

Were target analytes detected in the field blanks?

Were field blanks identified in this SDG?

X N N/A Y)N N/A

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

Sampling date: 4/7/10 Soil factor applied 100 Field blank type: (circle one) Field Blank / Rinsate / Other.

Field Blank: (bf)

ı	_	1	4	_	1	-	 _	_		_	_			-	 	_			_
13-10	ation																		
ımples:	Sample Identification																		
Associated Samples:	Sa																		
A																			
/ Other:		35																	
ank / Rinsate		No QUE15											T T T T T T T T T T T T T T T T T T T					The state of the s	
Field Bi	$\Big)\Big $	Action Level	1.3		·														
Field blank type: (circle one) Field Blank / Rinsate / Other.	Blank ID	FB-04072010-RZD (SDG#: 280-2216-2)	1.3					THE STATE OF THE S				1000		and the second s					
Field blan	Analyte		M																

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

100 # 260 000 PM

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates

2nd Reviewer:

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

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

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

X) N/A

Y(N) N/A

YN N/A

Were matrix spike percent recoveries (%R) within the control limits of 75-126? If the sample concentration exceeded the spike concentration by a factor

Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples? of 4 or more, no action was taken.

EVEL IV ONLY:

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

Qualifications	10 (0.537) (200)		-									
	91-51 000 bh											
RPD (Limits)	bh											
MSD %Recovery												
MS %Recovery	Automobile i											
Analyte	Mn											
Matrix	50,1											
MS/MSDylD	hycz.			Weeken of the Section								
#												

MSD.4SW

Comments:

LDC#: 23456P4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

2nd Reviewer:

METHOD: Metals (EPA Method 6020/7000)

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	13	14	RPD	Difference	Limits	(Parent Only)
Magnesium	12000	12000	0			
Manganese	370	410	10			

V:\FIELD DUPLICATES\FD_inorganic\23456P4.wpd

LDC #. 23486 PY SDG #: SECOVER

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: GZ

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

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

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

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ua/L)	Recalculated %R	Reported	Acceptable
	ICP (Initial calibration)					NO.	(Arr.)
	GFAA (initial calibration)						
ICV	CVAA (Initial calibration)	Hox	969	7.00	99	66	7-
	ICP (Continuing calibration)					.	
	GFAA (Continuing calibration)						
(C)	CVAA (Continuing calibration)	比	bo'h	900	91	hb	2-
4CV	ICP/MS (Initial calibration)	SH	h'Oh	0,04	101	101	
73)	ICP/MS (Continuing calibation)	Low	02/nG	5000	901	801	

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 # 23464PS SDG #5 CC COLON

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Page: Reviewer:_

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

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

%R = Found 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:

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

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

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

%D = ||-SDR| 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	True / D / SDR (units)	%R/RPD/%D	%R/RPD/%D	Acceptable (Y/N)
JCS (A)3	ICP interference check	135	Toral	100 ugl	loCí	(20))-
1.65	Laboratory control sample	ME	2160	7000	801	801	
52	Matrix spike	โพก์	h92 ©)	Ľb1	0451	1330	
232 Duplicate	Duplicate	May	11700	1.300 1.230	3	7	
SI	ICP serial dilution	اليك	K	h1h	0'9	h'S)

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 #: 2456 PM SDG #: <u>Secore</u>1

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

Please V N Y N Y N	see qu N/A N/A N/A	The manufacture of the contract of the	range of the instruments and within the linear range of the ICP?
Detect followin	ed analy	rte results fortion:	were recalculated and verified using the
Concent	tration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalculation: (100mL)(5)(0,606mg/L) =310mg/kg
RD FV In. Vol. Dil %S	= = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	(0,9124)(1.07g) =310m/lg

Sample ID	Analyte	Reported Concentration (MS/KS)	Calculated Concentration (MX/KX)	Acceptable (Y/N)
6	m	310	310	4

			•	
			·	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 25, 2010

LDC Report Date:

July 8, 2010

Matrix:

Water

Parameters:

Metals

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3955-3

Sample Identification

EB05262010-RZD EB05262010-RZDMS EB05262010-RZDMSD

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Manganese and Magnesium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Sample EB05262010-RZD was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB05262010-RZD	5/25/10	Manganese Magnesium	5.5 ug/L 56 ug/L	No associated samples in this SDG

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3955-3	All analytes reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Data Qualification Summary - SDG 280-3955-3

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3955-3	EB05262010-RZD	All analytes reported below the PQL.	J (all detects)	А	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Laboratory Blank Data Qualification Summary - SDG 280-3955-3

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Metals - Equipment Blank Data Qualification Summary - SDG 280-3955-3

No Sample Data Qualified in this SDG

Tronox Northgate Henderson Т

		Tronox Northgate Trenderson				
LDC #:	23456R4	VALIDATION COMPLETENESS WORKSHEE				
SDG #:	280-3955-3	Stage 2B				
Laboratory:	Test America					

Date: 7 - 7 - 1	Ó
Page:of_\	
Reviewer:C@	
2nd Reviewer:	_

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

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

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 5/25/10
11.	ICP/MS Tune	A	, in the second
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MSID
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
Χ.	Furnace Atomic Absorption QC	N	Noturined
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\wedge	,
XV	Field Bianks	SW	EB=1 (no apportanted samples)

Note:

A = Acceptable

N = Not provided/applicable

C. YCATER -

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	-	.00				
1	EB05262010-RZD	11	RBW	21	31	
2	EB05262010-RZDMS	12		22	32	
3	EB05262010-RZDMSD	13		23	33	
4		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:	

SDG #: See Cover LDC #: 23456R4

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer: Reviewer:

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

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

Were target analytes detected in the field blanks?

Reason Code: be

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 5/25/10 Soil factor applied

Associated Samples: 00 apportanted Samples Field blank type: (circle one) Field Blank / Rinsate / Other:

Sample Identification Action Level 5.5 99 Blank ID 5.5 26 Analyte ₽ 틸

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 25, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Manganese

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3955-4

Sample Identification

SA57-6BPC

SA57-7BPC**

RSAN7-3BPC

RSAN7-4BPC

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for 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 manganese was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.280 mg/Kg	All samples in SDG 280-3955-4
ICB/CCB	Manganese	1.37 ug/L	SA57-7BPC** RSAN7-3BPC RSAN7-4BPC
ICB/CCB	Manganese	1.11 ug/L	SA57-6BPC

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

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

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All 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 280-3955-4	All analytes reported below the PQL.	J (all detects)	А

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Data Qualification Summary - SDG 280-3955-4

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3955-4	SA57-6BPC SA57-7BPC** RSAN7-3BPC RSAN7-4BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Laboratory Blank Data Qualification Summary - SDG 280-3955-4

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Manganese - Field Blank Data Qualification Summary - SDG 280-3955-4

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ET

		Hollox Northgate Hellacison
LDC #:	23456S4	VALIDATION COMPLETENESS WORKSHE
SDG #:	280-3955-4	_ Stage 2B/4
Laborator	y: Test America	

Date:	7-1-10
Page:_	of
Reviewer:	a
2nd Reviewer:	

METHOD: Mn (EPA SW 846 Method 6020)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 5/25/10
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	D	
VI.	Matrix Spike Analysis	A	ms(D (SO6) 780-2216-10)
VII.	Duplicate Sample Analysis	Ν	
VIII.	Laboratory Control Samples (LCS)	A	us
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Notutilized
XI.	ICP Serial Dilution	A	Not utilized (506 pr 250-2216-10)
XII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	\sim	
XV	Field Blanks	NO	FB=FB-04072010-RZC (25022502)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

1	SA57-6BPC	11	21	31	
2	SA57-7BPC**	12	22	32	
3	RSAN7-3BPC	13	23	33	
4	RSAN7-4BPC	14	24	34	
5		15	25	35	
6		16	26	36	
7		. 17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:	

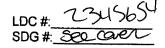
LDC#: 2345654 SDG#: Secover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 92
2nd Reviewer: 92

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				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?		,		
Were all initial calibration correlation coefficients ≥ 0.995?				
IV. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	1			
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?				



VALIDATION FINDINGS CHECKLIST

Page: __of __ Reviewer: __
2nd Reviewer: __

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC	-	1	1	
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?		<u> </u>		
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?			Δ	
XII. Sample Result Verification	······································			
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	7			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.			7	
XV. Field blanks				
Field blanks were identified in this SDG.	1		T	
Target analytes were detected in the field blanks.		/		

SDG #: See Cover METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) LDC #: 23456S4

VALIDATION FINDINGS WORKSHEET

PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: 100x x 5xdill

Associated Samples: All

Page: Reviewer: C

Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted: mg/Kg	Sample Concentration units, unless otherwise noted:	ed: mg/Kg	900) Soli preparation factor applied. Houx x 3xdii	
				and the second second		
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn	0.280			2.80		
Sample Cor	ncentration u	nits, unless o	Sample Concentration units, unless otherwise noted:	ed: mg/Kg	g Associated Samples: 2-4	
Analyte	Maximum PB³ (mg/Kg)	Maximum PB³ (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn			1.37	0.685		
Sample Co	ncentration u	nits, unless o	Sample Concentration units, unless otherwise noted:	ed: mg/Kg	g Associated Samples: 1	
Analyte	Maximum PB³ (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifier	
Mn			1.11	0.555		

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

SDG# SECONOR

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd Reviewer:

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

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

%R = Found x 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	% 8	20%	Acceptable
	ICP (initial calibration)					107	(MIX)
	GFAA (Initial calibration)						
	CVAA (initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
Icv	ICP/MS (Initial calibration)	$\mathcal{L}_{\mathcal{L}}$	39.8	UOh	$ \mathcal{B} $	99	7-
\ \ \ 	ICP/MS (Continuing calibation)	+	483	SO (C)	8	12	

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

1DC# 234855 SBG #: JERGELON

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: Reviewer: 2nd Reviewer:

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

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

%R = Found × 100 True

Where, Found = Concentration of each analyte <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:

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

Where, S = Original sample concentration

D = Duplicate sample concentration

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

%D = II-SDR × 100

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

					Recalculated	Renorted	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable
ICAB	ICP interference check	ج	ag. Logh	1000	blo	8	5
527	Laboratory control sample		18.5	76.0	23	8	
SA177-968R Matrix splike	Matrix spike		(ssr-sr)	022	(74xxp; Ke)		
	Duplicate		762	7777		200	
	ICP serial dilution	>	7 (200)	2560	\\ <u>\</u>) (

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

LDC #: 245654 SDG #: <u>Secore</u>

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

		•				
YN	see qu N/A N/A N/A	alifications below for all Have results been rep Are results within the o Are all detection limits	alibrated range of the i	. Not applicable question rrectly? Instruments and within t	ons are identified as " he linear range of the	'N/A". ICP?
Detect followi	ted analy	yte results fortion:	M	\	were recalculated an	d verified using the
Concen	tration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Recalcu	ulation:		
RD FV In. Vol. Dil %S	= = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight Dilution factor Decimal percent solids	(G)	(100m L)(5) (0,93)(1	(7.168mg/L)) = 3700mg/kg
		,				

		1 (0,93)(1030	
Sample ID	Analyte	Reported Concentration (MSIC)	Calculated Concentration (makky)	Acceptable (Y/N)
2	M	3700	3700	17
		<u> </u>		
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Tronox LLC Facility, PCS, Henderson, Nevada Data Validation Reports LDC #23456

Perchlorate



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 17, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B & 4

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3624-5

Sample Identification

SSAM6-02-10BPC SSAM6-03-10BPC**

^{**}Indicates sample underwent Stage 4 review

Introduction

This data review covers 2 soil samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

IV. Matrix Spike/Matrix Spike Duplicates

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 280-3624-5	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 280-3624-5

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3624-5	SSAM6-02-10BPC SSAM6-03-10BPC**	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 280-3624-5

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-3624-5

No Sample Data Qualified in this SDG

Tronox Northqate Henderson EET

LDC #: 23456K6	VALIDATION COMPLETENESS WORKSHE
SDG #: 280-3624-5	Stage 2B/4
Laboratory: Test America	

	Date: 7-1-10
	Page: _t_of \
	Reviewer:
2nd	Reviewer:/_

METHOD: (Analyte	Perchlorate ((EPA Method 314.0)
	, unally co	I Civiliolate	LET TYPE CHOOL OF 1.07

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
ı.	Technical holding times	A	Sampling dates: 5/17/10
lla.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	\mathcal{N}	
V	Duplicates	\wedge	,
VI.	Laboratory control samples	A	US/D
VII.	Sample result verification	A	Not reviewed for Stage 2B validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	\mathcal{N}	
L_X_	Field blanks	LNO	FB=FB-04072010-RZC (250-230-2)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

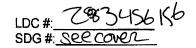
D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples: ** Indicates sample underwent Stage 4 validation

,	<u> 501 \</u>					
1	SSAM6-02-10BPC	11	PB5	21	31	
2	SSAM6-03-10BPC**	12		22	32	
3		13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:			
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VALIDATION FINDINGS CHECKLIST

Page:_ Reviewer:_ 2nd Reviewer:_

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

LDC #: 23456 (6) SDG #: See care?

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 2 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?	/	<u>.</u>			
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.		7			

Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

2nd Reviewer:

Method: Inorganics, Method ____

The correlation coefficient (r) for the calibration of $\overline{\rm CO_{+}}$ was recalculated.Calibration date: $\overline{\it SICIIO}$

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

%R = Found X 100

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

Where,

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	_	0.00284			
		s2	2.5	0.0077	0.999314	0.999358	
	(83	5	0.0154			
		84	10	0.03108) —
) _	s5	20	0.06039			
		98	40	0.13055			
Calibration verification		ICV	20	P,cox	99		
Calibration verification		CCV	\mathcal{K}	X 18.382	95		
Calibration verification	\rightarrow	\rightarrow	9	701 PHT.01	107	(>

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.

23486/68 SDG#: SECOND

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: 2nd Reviewer: Reviewer:

METHOD: Inorganics, Method Second

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

Where, %R = Found x 100

Found =

True ==

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

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

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

Duplicate sample concentration Original sample concentration

S O

	-				Recalculated	Reported	
Sample ID	Typs of Analysis	Element	Found / S R	(unite) 18/15	%R / RPD	%R / RPD	Acceptable (Y/N)
(Laboratory control sample						
		70 0	04 8.7	<i>b'6</i> b	66	66)~
	Matrix spike sample		(SSR-SR)				
2							
		•					
>	Duplicate sample						
-							

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

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LDC #:_	
SDG #:	seconor

VALIDATION FINDINGS WORKSHEET

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

SDG #: See COLD	Sample Calculation	Nerification	Reviewer 2nd reviewer	
METHOD: Inorganics, Method	secare			
Please see qualifications below for all Y N N/A Have results been re Y N N/A Are results within the Y N N/A Are all detection limit Compound (analyte) results for recalculated and verified using the form	ported and calculated correctly calibrated range of the instant sellow the CRQL?	ectly? truments?	e Identified as "N	
Concentration =	Recalculation: ((0.04157(306,9)	607)+0,39	1769) (500) (100
(104=(1306.9607) + 0.3547669)		0915)(10.1	188)	= 710,000

#	Sample ID	Analyte	Reported Concentration (/4 5)	Calculated Concentration (MG/15)	Acceptable (Y/N)
	2	C104	710000	22-72000	4
				710000	
		·			-
				·	
					

Note:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 18, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3679-7

Sample Identification

SSAM6-04-3BPC

Introduction

This data review covers one soil 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.

Raw data were not reviewed for this SDG.

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-05182010-RZC (from SDG 280-3679-3) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-05182010-RZC	5/18/10	Perchlorate	3.3 ug/L	All samples in SDG 280-3679-7

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

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3679-7	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-3679-7

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3679-7	SSAM6-04-3BPC	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 280-3679-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-3679-7

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-3679-7

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET Stage 2B

LDC #: 23456L6 SDG #: 280-3679-7 Laboratory: Test America

Reviewer: 2nd Reviewer:

METHOD: (Analyte)	Perchlorate	(EPA Method 314.0)	
` • • • •		***************************************	

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 5/18/15
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
111.	Blanks	À	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	T 4
VI.	Laboratory control samples	A	LESIO
VII.	Sample result verification	N	- 1 V
VIII.	Overall assessment of data	l A	
IX.	Field duplicates	\mathcal{N}	· ·
X	Field blanks	SW	FB=FB-04072010-RZC, EB=EB-05182010-RZC
Note:	A = Acceptable ND =	No compound	FB=FB-04072010-RZC, EB=EB-051872010-RZC (280-7280-2) (280-3679-3) D=Duplicate

N = Not provided/applicable

C 1

SW = See worksheet

R = Rinsate

FB = Field blank

TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>						
1	SSAM6-04-3BPC	11	PBS	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27	3.00	37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:			
	,		

LDC #: 23456L6

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

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

Were target analytes detected in the field blanks?

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

Sampling date: 5/18/10 Soil factor applied 10x

Sampling date: 5/18/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples: (B)

₹

Reason Code: be

Sample Identification No Quals **Action Limit** 0.33 EB-05182010-RZC (SDG#: 280-3679-3) Blank ID 3.3 Analyte

CIO4

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, PCS, Henderson, Nevada

Collection Date:

May 18, 2010

LDC Report Date:

July 8, 2010

Matrix:

Soil

Parameters:

Perchlorate

Validation Level:

Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 280-3679-8

Sample Identification

SSAM6-04-2BPC

Introduction

This data review covers one soil 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.

Raw data were not reviewed for this SDG.

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-05182010-RZC (from SDG 280-3679-3) was identified as an equipment blank. No perchlorate was found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB-05182010-RZC	5/18/10	Perchlorate	3.3 ug/L	All samples in SDG 280-3679-8

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

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 280-3679-8	All analytes reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Data Qualification Summary - SDG 280-3679-8

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
280-3679-8	SSAM6-04-2BPC	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Laboratory Blank Data Qualification Summary - SDG 280-3679-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Equipment Blank Data Qualification Summary - SDG 280-3679-8

No Sample Data Qualified in this SDG

Tronox LLC Facility, PCS, Henderson, Nevada Perchlorate - Field Blank Data Qualification Summary - SDG 280-3679-8

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

	Honox Hortingate Henderson
LDC #: 23456M6	VALIDATION COMPLETENESS WORKSHEET
SDG #: 280-3679-8	Stage 2B
Laboratory: Test America	

	Date:	7-7-10
	Page:_	<u>Lof_1</u>
	Reviewer:	R
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	0	Sampling dates: 5/18/10
Ila.	Initial calibration	A	
llb.	Calibration verification	P	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	\mathcal{N}	Clientspecified
V	Duplicates	<i>\</i>	1
VI.	Laboratory control samples	A	LSD
VII.	Sample result verification	N	•
VIII.	Overall assessment of data	A,	
IX.	Field duplicates	$ \setminus \mathcal{N}_{\setminus}$	
X	Field blanks	15W	FB=FB-04072010-RZC. EB=EB-05182010-RZC

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

(750-77-80-7)
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

	<u>~~</u>				
1_	SSAM6-04-2BPC	11	935	21	31
2		12		22	32
3		13		23	33
4		14		24	34
5		15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:		

LDC #: 23456M6

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

METHOD: Inorganics, EPA Method See Cover

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

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 5/18/10 Soil factor applied 10x Field blank type: (circle one) Field Blank / Rinsate / Other: EB

Reason Code: be

₹

Associated Samples:

Analyte	Blank ID	Action Limit		Sample Identification	c	
	EB-05182010-RZC (SDG#: 280-3679-3)		No Quals			
CIO4	3.3	0.33				
			- Control of the Cont		-	
					100	
			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			